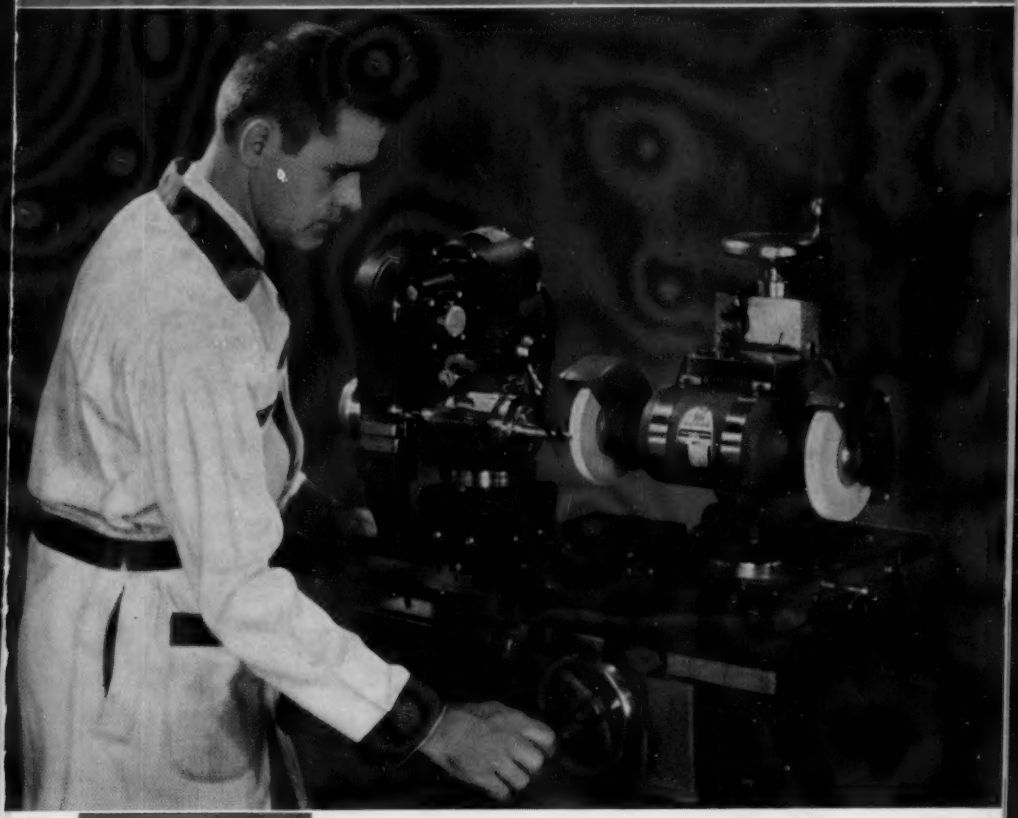
# modern machine shop

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See Page 102

ROUTING AIRFRAME PARTS
See Page 104

METAL SHOW
See Page 132

OCTOBER
1956



**RO**
**UNIVERSAL FORM RELIEVING FIXTURE**

**R-O Grinder**

*The life of many perishable cutting tools can be doubled by proper grinding.* *See page 6.*



# Working in the dark on TITANIUM MACHINING?

. . . THESE RECOMMENDED FEEDS AND SPEEDS FROM ADAMAS WILL HELP END YOUR DIFFICULTIES!

Now your problems in machining titanium can be considerably lessened with these valuable facts and figures tabulated from *actual production runs* by several of the East Coast's largest aircraft and engine producers.

Choice of ADAMAS carbide for these titanium jobs was determined through pre-testing against the grades of three other leading carbide producers. Against this stiff competition, ADAMAS outperformed all other grades by *4 or 5 to 1!*

***If you're already machining titanium or planning to, be sure to specify —***

ADAMAS Grade BB for improved performance in heavy roughing and scale cuts.

ADAMAS Grade B, the ideal grade for general machining and semi-roughing.

ADAMAS Grade A for perfect finish turning and milling operations.

Since the proof of the carbide is in the cutting and not the advertising, don't read our claims—test them! Plan a test of ADAMAS' grades for titanium today!

**ADAMAS RECOMMENDED FEEDS AND SPEEDS for machining TITANIUM ALLOYS***

(For machining commercially pure titanium, type TI-75A, double speeds.)

| | Scaly Forgings | No scale semi-roughing | Finish turning, boring & facing | Milling |
|---|---|---|---|---|
| Grade of Carbide | ADAMAS Grade BB† | ADAMAS Grade B | ADAMAS Grade A | ADAMAS Grade A |
| SFPM | 50 | 150 - 200 | 300 | 350 |
| Feed | .010 - .020 | .010 - .020 | 005 .010 | .003 per tooth |
| Depth of Cut | .250 - 500 | .250 | 015 - 032 | |

**HELPFUL "TIPS"**

**How To Eliminate *Vibration***

To end tool vibration, use as large a shank size as possible on the tool. For severe roughing or scaly cuts use a high lead angle. Another "tip" is to hone a 45° land on the cutting edge approximately .005" to .010" wide . . . or reduce feed.

**What To Do About *Scale or Oxide***

In machining titanium forgings covered with scale or oxide, use as large a radius as possible on your tool. This radius, however, must be kept below the point where vibration will be encountered.

* These figures represent approximate starting points and should be adjusted to your own machines and set up conditions.

† Figures on ADAMAS Grade BB represent a rough face front flange operation of 682 Titanium Alloy on a Bullard VTL machine. The size of the material was:

Diameter—17½" Length of cut—5"

**ADAMAS Grade BB delivered 12-15 pieces per grind.** Figures on Grades A & B available upon request.

**TEST WITHOUT OBLIGATION! For an actual machine test or detailed titanium machining literature, contact: Technical Service Div., ADAMAS Carbide Corp., Dept. 421 Kenilworth, N. J.**

ADAMAS

CARBIDE CORPORATION

KENILWORTH, NEW JERSEY

*Producers of tungsten carbide tools, tool tips, dies, wear parts, Dex-A-Tool and Ceralox.*

**For more data circle "Second Cover" on Reader Service Card**

OCTOBER
1956
Vol. 29
No. 5

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# modern machine shop

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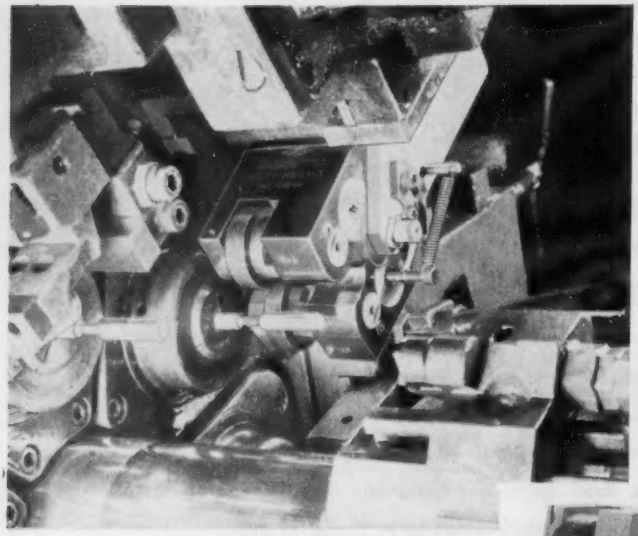
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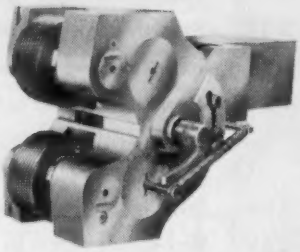
Member
BPA
NBP

Published monthly and copyrighted (1956) by Gardner Publications, Inc., 431 Main St., Cincinnati 2, O.
Printed in U.S.A. Accepted as controlled circulation publication at Cincinnati, Ohio.

*(For more information on cover advertisements, use Reader Service Cards opposite pages 32 and 404.)*







# over 1,100,000 threads with 1 set of rolls...

Long roll life resulting from the basic design of the LANROLL Thread Rolling Attachment is demonstrated in the production of studs at the M & S Morenci Corporation in Morenci, Michigan.

#10-32 pitch NF threads, 350" long, are rolled on 1020 screw stock using a #14 GA LANROLL Attachment on a 9/16" Acme-Gridley Automatic. Rolling next to the collet .030" back of the shoulder, and threads are held to ±.00025" on the pitch diameter.

LANROLL Attachments are made in five sizes to roll both fine and coarse pitch threads to Class 4 tolerances. Send specifications and ask for Bulletin G-96.

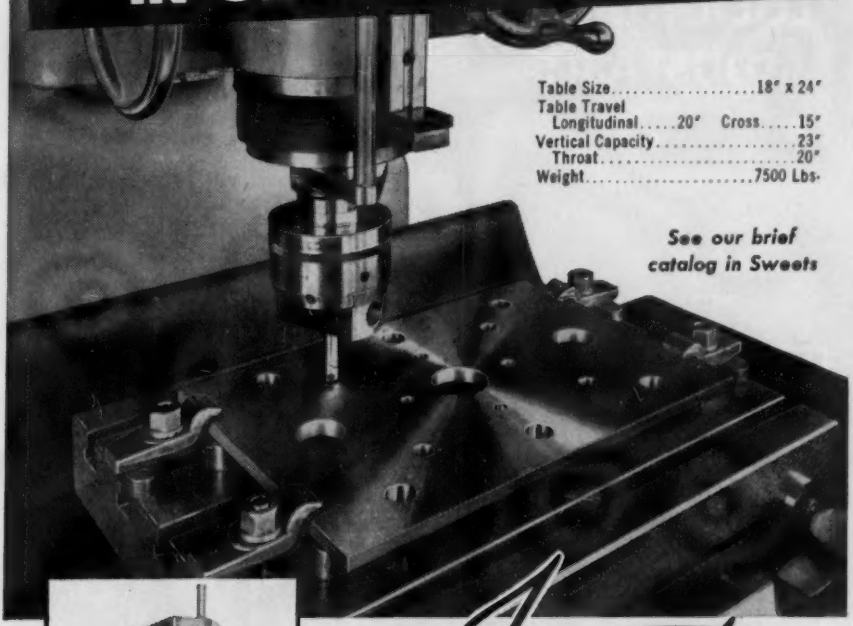
**LANDIS *Machine* COMPANY**

**WAYNESBORO • PENNSYLVANIA • U. S. A.** 452

For more data circle **201** on Reader Service Card

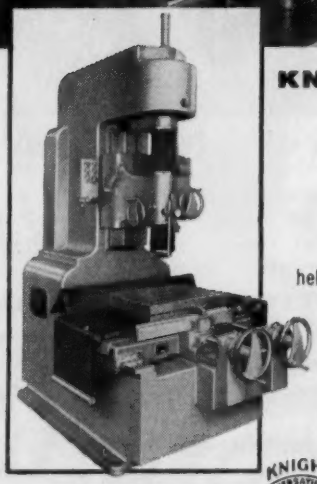
*Believe It Or Not—*

# 17-HOLE JIG FINISHED IN ONLY 55 MINUTES!



| | |
|---|---|
| Table Size | 18" x 24" |
| Table Travel Longitudinal | 20" |
| Cross | 15" |
| Vertical Capacity | 23" |
| Throat | 20" |
| Weight | 7500 Lbs. |

*See our brief catalog in Sweets*



KNIGHT'S *Jigmaster*

Starting from the solid, time includes all locating, tool changing, spindle speed changes, drilling, reaming and boring. Reamed and bored holes were held to ±.0002" on size; ±.0005* on location. Completing holes in this 5⅛" jig plate required 56 tool changes, 43 spindle speed changes, 23 table settings. Holes were center drilled, drilled one or more times, either reamed or bored. Bored holes finished to size with preset bars; 2¼" center hole finished with offset head making 4 cuts. This record time could only have been done with the Jigmaster's quick tool change and fast table setting features.

*Accuracy to .0001" available with gauge blocks.

*Write For Catalog*

KNIGHT VERSATILE ACCURATE

**W. B. KNIGHT MACHINERY COMPANY**

3922 West Pine Boulevard • St. Louis 8, Missouri

For more data circle 202 on Reader Service Card

# EXTRA SAFETY... AT NO EXTRA COST

## with Williams patented *LOCKING* ADJUSTABLE




SAFETY FIRST — POSITIVE LOCK MAINTAINS SELECTED OPENING

SAFETY FIRST — NO ACCIDENTAL ROTATION OF ADJUSTING KNURL

SAFETY FIRST — POSITIVELY NO CHANGE IN ADJUSTMENT UNDER PRESSURE

• You can use a Williams Locking Adjustable with confidence. The sure-grip of its "locked-in" adjustment makes it safer to use.

Why accept less when you can get the best . . . at no extra cost. Made in 6, 8, 10 and 12 inch sizes. You'll get prompt service at lowest cost by ordering through your local distributor.

J. H. WILLIAMS & CO. 410 VULCAN STREET BUFFALO 7, N. Y.



WILLIAMS

INDUSTRIAL TOOLS

*"The Broadest Line of Its Kind"*



For more data circle 203 on Reader Service Card

*Heald VERSATILITY in action*

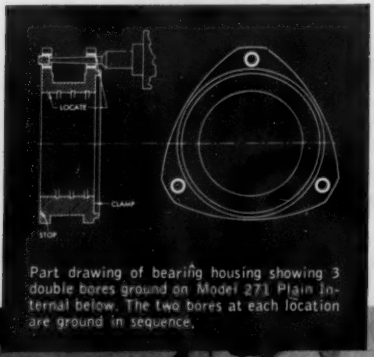
# How a STANDARD* Plain Internal Grinder SAVED IDLE MACHINE TIME

**Heald Model 271 does a month's production ALL IN A DAY'S WORK . . . and can do many other jobs in its "spare time"**

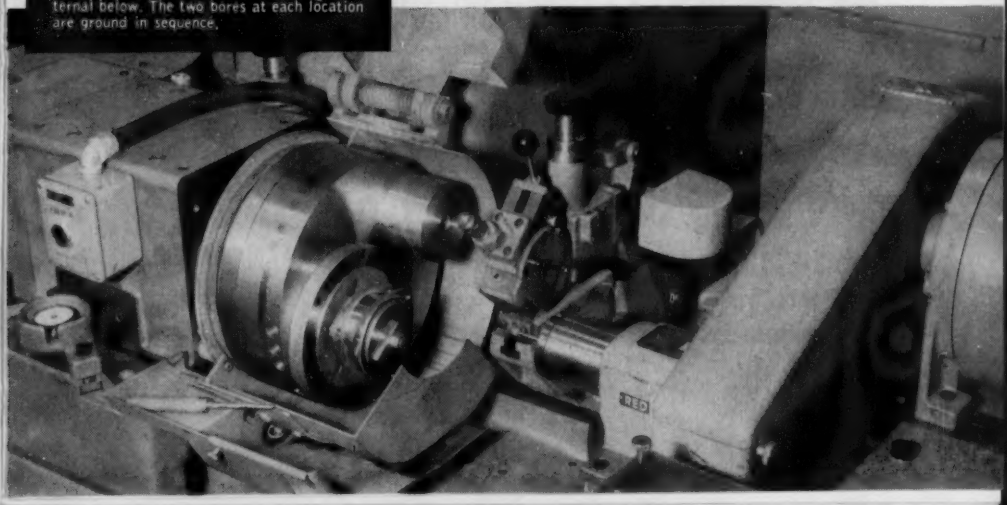
THE race is not always to the swift. For example: An aircraft manufacturer requested a quotation on a Model 271 Size-Matic for grinding three double bores in a bearing housing. Production requirements—25 parts per month. A high-speed Size-Matic would do the whole job in less than a day—and be idle the rest of the time. So Heald engineers recommended a Model 271 Plain Internal instead. This *semi-automatic* machine could still do the whole month's production in one day—yet because of its inherent *versatility*, the standard Plain machine could be used for many other internal grinding jobs in its "spare time".

This solution to the problem not only saved on the initial investment, but avoided idle machine time and contributed to greater productivity and lower costs. The 271 Plain Internal, and the job for which it was ordered, are shown below. For the *best answer* to any precision finishing problem . . . *It PAYS to come to HEALD*

HEALD




Part drawing of bearing housing showing 3 double bores ground on Model 271 Plain Internal below. The two bores at each location are ground in sequence.



* *Send for Bulletin 2-2569-1, Issue 1.*

**THE HEALD MACHINE COMPANY**

Subsidiary of The Cincinnati Milling Machine Co.

**Worcester 6, Massachusetts**

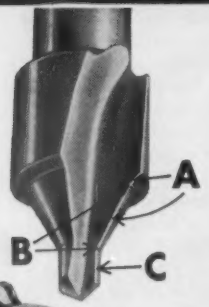
Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York

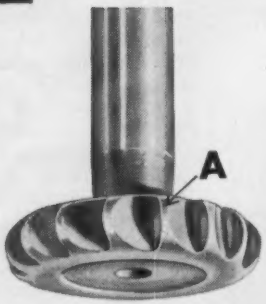
# RO
## UNIVERSAL FORM RELIEVING FIXTURE

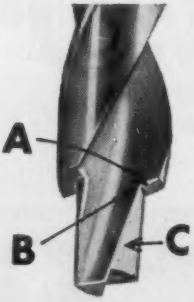
## R-O Grinder

***THE LIFE OF MANY STANDARD AND SPECIAL PERISHABLE CUTTING TOOLS CAN BE DOUBLED BY PROPER GRINDING***

*(See Front Cover)*






**A** Sharpens these cutting edges with any degree of form relief.

**B** No undercutting at intersection — no burr on work piece.

**C** Diameters can be cylindrically ground or relieved as desired.

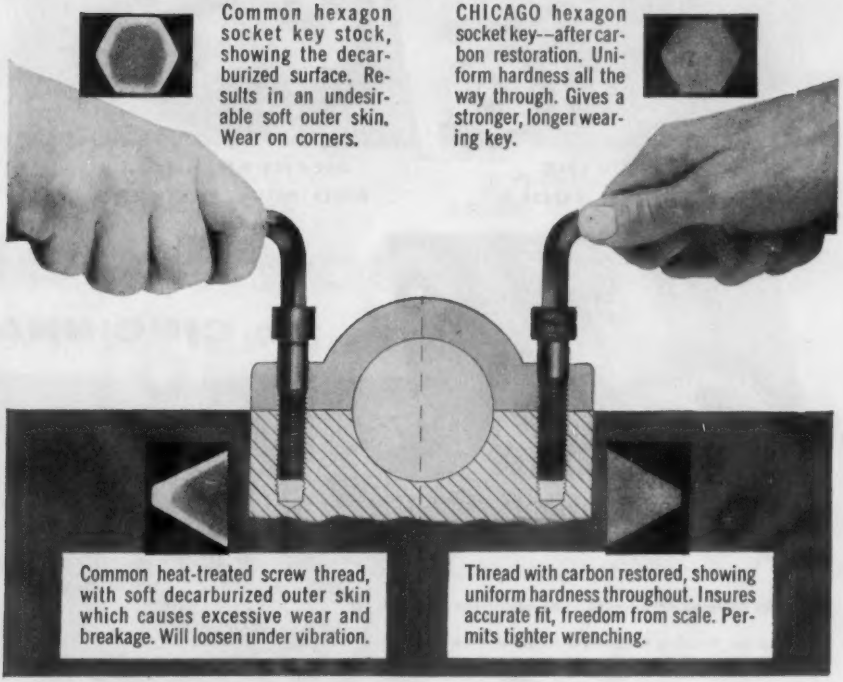
There is a constant increase in the number of shops bringing their tool grinding practices up to date by standardizing on form relief sharpening as a means of reducing tool costs. No other fixture offers the ease of set-up and operation and the flexibility of the "RO" Universal Form Relieving Fixture.

**WRITE FOR CATALOG**

**GRINDER DIVISION**
**ROYAL OAK TOOL & MACHINE CO.**
29800 STEPHENSON HY.
ROYAL OAK, MICH.

For more data circle **205** on Reader Service Card

# How carbon affects fastener performance




**Screw fasteners may look identical, but the microscope reveals wide differences in their ability to "take it".**

Steel hardness depends on the precise amount of carbon in its structure. But during steel manufacture this vital surface carbon is inevitably lost. Result (shown above) is a soft, decarburized outer skin in the finished fastener, causing thread stripping, fatigue failure, excessive wear, or loosening under vibration.

The soft "decarb" layer is eliminated by The Chicago Screw Company's unique "Carbon Restoration" process in which surface carbon is replaced during heat treating. The process is precisely controlled to give uniform hardness from core to surface.

All Chicago "Safety-Plus" Socket Screw Products and heat-treated cap screws have the benefit of *Carbon Restoration* plus complete quality control from start to finish. For full information and catalog, write our Standard Products Division.

## THE CHICAGO SCREW COMPANY

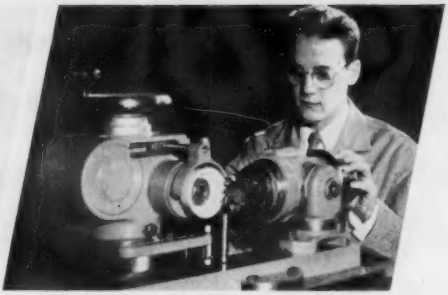
DIVISION OF STANDARD SCREW COMPANY • ESTABLISHED 1872

2803 WASHINGTON BOULEVARD, BELLWOOD, ILLINOIS

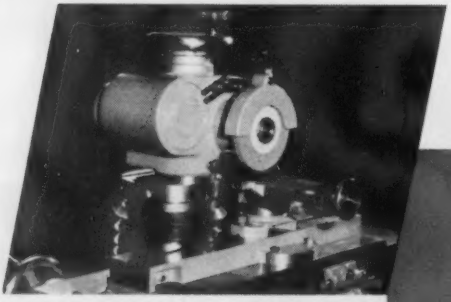
For more data circle **206** on Reader Service Card



GRIND LATHE
AND PLANER TOOLS*



SHARPEN SHELL
END MILL CUTTERS



GRIND FLAT SURFACES*

# Look
## on CINCINNATI




*Surface Grinding Attachment. Extra equipment.

†Cylindrical Grinding Attachment required. Work is ground dry.

**CINCINNATI No. 1 CUTTER AND TOOL GRINDER**

Catalog No. M-1852-1

CINCINNATI



SHARPEN STAGGER TOOTH CUTTERS



CYLINDRICAL GRIND DIAMETERS†

# What You Can Do

## No. 1 CUTTER AND TOOL GRINDERS

You can do a lot of fine work on CINCINNATI® No. 1 Cutter and Tool Grinders . . . the type of work that will help your production machines operate at higher efficiency. CINCINNATI No. 1's are designed to sharpen and recondition a variety of small- to medium-sized cutters; to sharpen them accurately, quickly, safely. The No. 1's are tops for the type of cutter and tool grinding operations shown here. Some of the reasons why include:

**Anti-friction table slide**

**Cartridge type, preloaded anti-friction grinding wheel spindle mounting**

**Eccentric wheelhead swivel**

**Built-in reversible motor**

**. . . and a dozen additional reasons**

Get a copy of the catalog covering these fine Cutter and Tool Grinders, and show it to your men who are responsible for this type of work. You can count on their opinion. Brief specifications will be found in Sweet's Machine Tool File, and complete data may be obtained by writing for catalog No. M-1852-1.

**THE CINCINNATI MILLING MACHINE CO., CINCINNATI 9, OHIO**

**MILLING MACHINES • CUTTER SHARPENING MACHINES • BROACHING MACHINES • METAL FORMING MACHINES**

**HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID • GRINDING WHEELS**

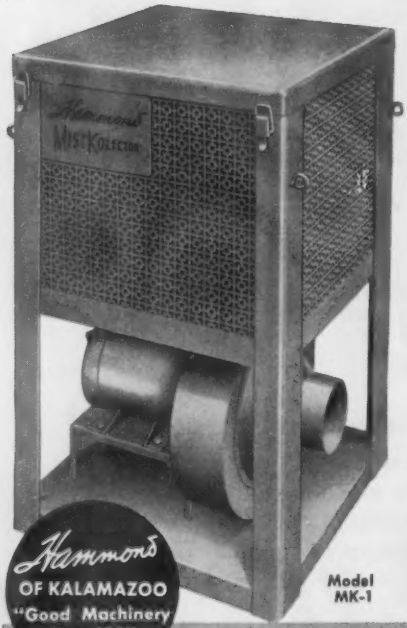
For more data circle **208** on Reader Service Card

# CAPTURE

## MIST·FOG·SMOG

## with a

# Hammond MISTKOLECTOR




Model MK-1

Mist, Fog and Smog from automatic screw machines, lathes, surface and cylindrical grinders, and other machine tools can now be captured with a Hammond MistKolector. Requires little floor space, or can be suspended from ceiling. Two models available.

Hammond MistKolectors soon pay for themselves as they:

- **Collect fog, mist and smog**
- **Recover coolant for re-use**
- **Give operators cleaner air to breathe**
- **Keep plant cleaner and reduce maintenance costs**
- **Reduce fire hazards**

**Write for Literature and Installation Photos**

Hammond OF KALAMAZOO "Good Machinery Since '82"

Hammond Machinery Builders Inc.

1615 DOUGLAS AVE. • KALAMAZOO, MICH.

See us at Booth No. 1250 Metal Show, Cleveland—October 8-12

For more data circle **209** on Reader Service Card

# BURGMASTER®

POWER INDEXING

## *Turret Drills*

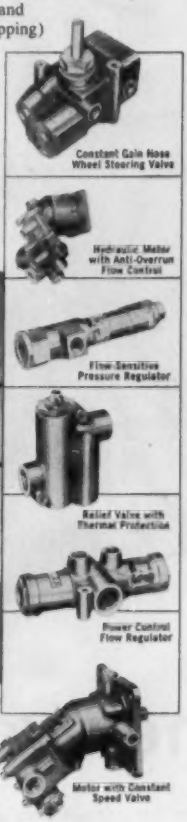
**step up AN porting operation 25% at Vickers, Incorporated**

Vickers, Inc., Div. of Sperry Rand Corp., El Segundo, Calif., manufacturers of hydraulic equipment, use both hand-operated and automatic hydraulic Burgmaster Turret Drills in their production lines. The company states that the AN porting operation on hydraulic valves has been stepped up approximately 25% over the old single spindle method. Vickers have found that the Burgmasters maintain sizes accurately, are easily set up, and perform multiple operations (drilling, reaming, counterboring, tapping) in one set-up, with one operator—automatically.

Automatic hydraulic Burgmasters (6 and 8 spindle models) feature skip indexing, automatic cycling and infinitely variable preselective feeds. All models (including the 6 spindle manuals) provide power indexing, pre-selective spindle speeds and very close pre-selective depth control.



*These Vickers airborne hydraulic valves are typical of parts on which Burgmaster Turret Drills are speeding production.*




*For complete information, address Dept. MM-10*

**BURG TOOL**
*Manufacturing Company, Inc.*
15001 South Figueroa Street, Gardena, California
*Sales Offices:* RIDGEWOOD, N. J. — CHICAGO — SAN FRANCISCO

For more data circle **210** on Reader Service Card




- 9" column; 3' or 4' arm
- spindle speed ratio of 40-to-1
- 12 speeds (up to 3200 rpm) through direct-reading dial
- automatic tapping reverse
- adjustable spring counterbalance (feel remains the same from lightest to heaviest tools)
- hardened tang slot
- safety elevating nut and screw (arm can't drop or overrun)
- hardened arm ways for head
- rigid accurate spindle mounted on 5 precision ball bearings

You can acquire this radial for only $.28 an hour, if you operate two 40-hour shifts, by using Gilbert's new financing plan: 6% simple interest (3% add on), up to 5 years to pay (subject to change)

*those who buy*
**GILBERT**
*buy Gilbert again*

# newest *high-speed* radial

Your many demands for a high-speed light-duty radial are met—completely and economically—by this new Gilbert 3 hp machine. Compare the features at the right with other radials of equal capacity, and you see why the Gilbert is the best buy in its class. Traditional Gilbert accuracy, fast response, and wide-angle work visibility make your shop more productive, more versatile. Variety of bases, runway mounting, or tables available. Get all the details in Bulletin 255.

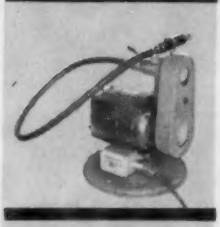
*The Cincinnati Gilbert Machine Tool Co.*
*3340 Beekman Street, Cincinnati 23, Ohio*

haskins

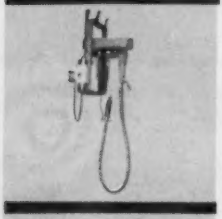














# To Finish the Job... Start with HASKINS

For grinding, rotary filing, polishing and a host of other metal-working jobs, HASKINS flexible shaft machines are BETTER, FASTER, CHEAPER. On special jobs or for steady production line work, a start with HASKINS equipment insures positive power, top-notch performance and a perfect finish — a big consideration for any plant to remember. You should know about HASKINS flexible shaft machines and accessories— **leaders in their field for over 30 years.**

***Send for a Catalog and Literature Today***

**R. G. HASKINS co.**

HASKINS

*2647 W. Harrison St.*
*Chicago 12, Illinois*

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# GISHOLT DYNETRIC
# TYPE "U" BALANCER



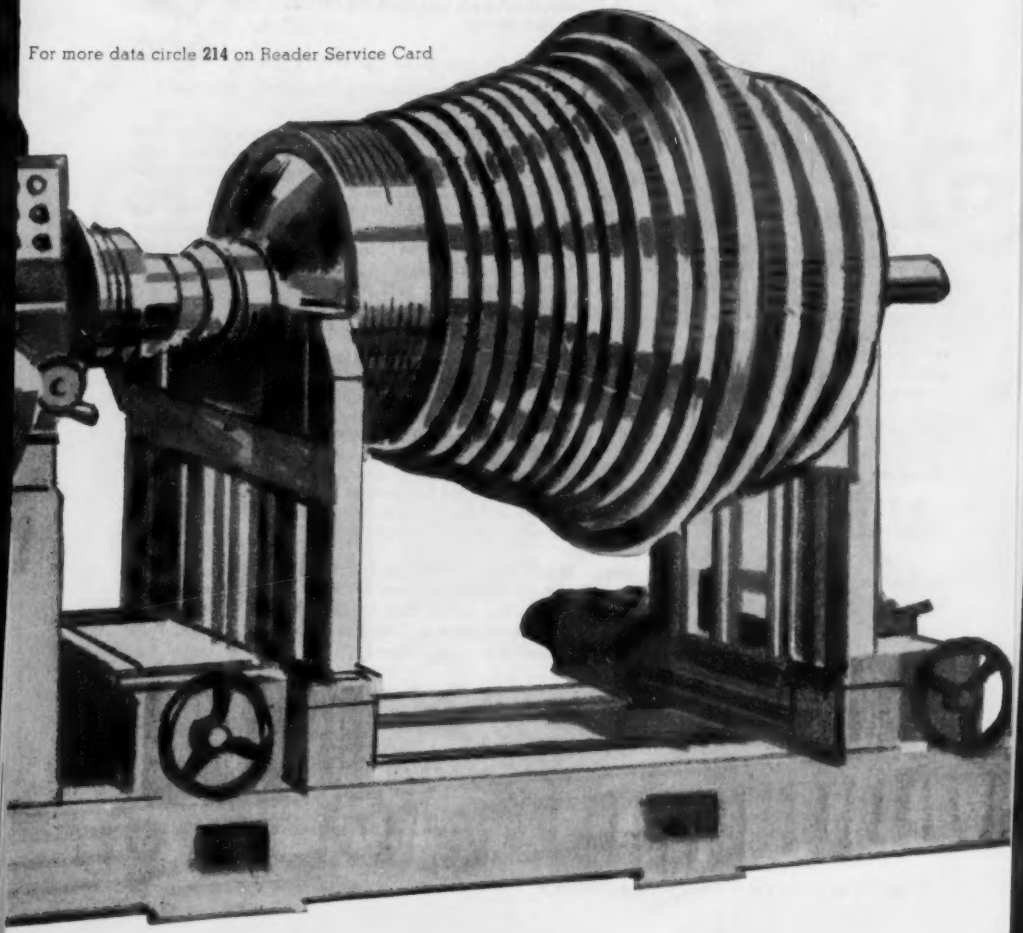
MASTERLINE
GISHOLT SINCE 1887

This latest design Gisholt DYNETRIC Type "U" Balancer has many outstanding features for quicker setup and faster, easier operation. Unbalance effects are accurately measured and located by unskilled operators. No computation is required—no charts or graphs. In short, here is a truly advanced design for better work at lower cost. If you're interested in the balancing of rotating parts or assemblies, large or small, let us tell you about these new machines —and show you how they may be applied profitably to your manufacturing processes.

**Gisholt Machine Company, Madison 10, Wisconsin**

***Look ahead—keep ahead—with Gisholt***

For more data circle **214** on Reader Service Card



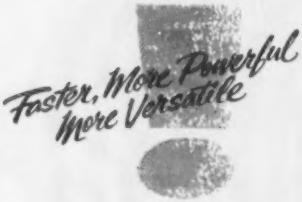
# *what's going on at* MARVEL?

**1. A NEW BUILDING PROGRAM...**




Not long after you read this, we will have completed the MARVEL plant expansion program which will *double* our already considerable manufacturing space. MARVEL'S confidence in the future and its continuing development, coupled with the increasing demand for MARVEL Hack Saws, Band Saws and Hack Saw Blades, makes this expansion mandatory.

**2. A NEW "SUPER" BAND SAW**




In our enlarged plant, we will demonstrate for the first time, a completely new, heavy duty, all-hydraulic, fully universal MARVEL Band Saw designed especially for High Speed Steel Band Saw Blades. This new "Super" Band Saw is heavier, more powerful and rugged than any band saw yet available. It incorporates a great many new and exclusive design and operating features to make it the most advanced Band Saw for BOTH high production and universal work.

**3. AN INVITATION TO "TRY" BEFORE YOU BUY**




One or more of the new Band Saws will be set up in our new plant, together with new, improved MARVEL Hack Saws, to demonstrate comparative performance on a wide variety of work. We will also set up specific cutting-off jobs requested by customers or prospective purchasers on *both* types of machines and arrange to have interested personnel observe and check the demonstration of comparative saw performance *on their own work.*

**What better way is there to prove to yourself the speed, accuracy, efficiency and economy of MARVEL Saws and to select the right type of saw (hack saw or band saw) to best fit your individual job requirements?**

FG—1700

**ARMSTRONG-BLUM MFG. CO.**
5700 Bloomingdale Avenue • Chicago 39, Illinois

MARVEL Metal Cutting SAWS
Better Machines-Better Blades

For more data circle **215** on Reader Service Card

# NOTICE

## to users of spindles* that need repair or rebuilding

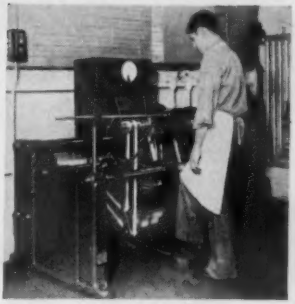
**POPE** — the leading builder of precision spindles IS THE BEST PLACE TO HAVE YOUR SPINDLES MADE GOOD AS NEW.

Today's grinding, milling and boring tolerances demand precision spindle performance.

Pope puts your spindles in shape *quickly*, at lowest cost. (Cost figures are promptly submitted for your approval before the work is done.)

The same expert craftsmen that build Pope Precision Spindles will assemble, preload and lubricate the proper bearings and dynamically balance. The job will be done *right* the first time.

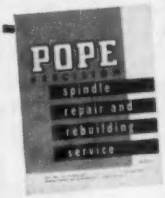
**Send Your Spindles for Repair to POPE**



Spindles repaired and rebuilt by POPE are assembled in an electrically air cleaned, air conditioned room. They are dynamically balanced, as pictured, to the same tolerances as new spindles. This assures better surface finishes and smoother running spindles.

* POPE Repair and Rebuilding Service applies to ANY SIZE, ANY MAKE of Anti-Friction Bearing SPINDLES.

**Belt Driven**
**Motorized**
**High Cycle**




**POPE MACHINERY CORPORATION**
261 River St., Haverhill, Massachusetts

Mail me a copy of Bulletin R-1 describing in detail Pope Precision Spindle repair and rebuilding service:

Name.....

Company.....

Address.....

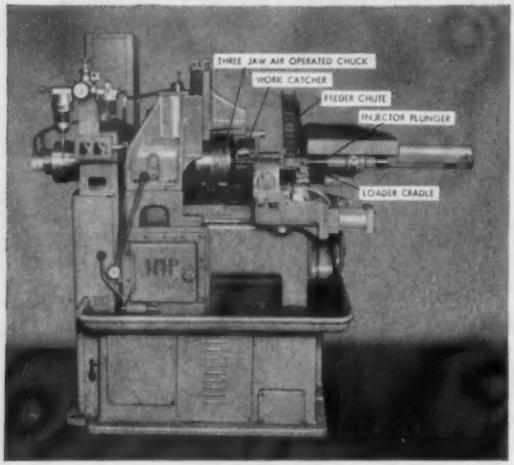
City.....Zone....State.....

**No. 114**

For more data circle **216** on Reader Service Card

# MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE *Lo-swing* PEOPLE" SENECA FALLS, NEW YORK




## *Lo-swing* IMP AUTOMATIC LATHE MACHINES CAST IRON SLEEVES AT A FAST PACE

**PROBLEM:** To bore, face and partially turn cast iron sleeves on a full automatic cycle including loading and unloading.

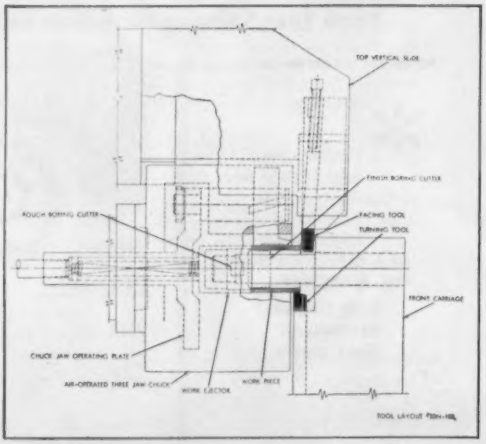
**SOLUTION:** A Lo-swing IMP Automatic Lathe was selected for this job due to its rigidity, compactness and productivity when equipped with Seneca Falls Automatic Injector Type Work Handling Equipment.

The cast iron sleeves, 1-13/16" in diameter and 2" long, are delivered at the machine direct from the foundry and are placed in the feeder chute where they flow by gravity into a loader cradle. In this position, the sleeves are picked up, one at a time, by the pneumatically operated injector plunger, and injected into the three-jaw air-operated chuck. The injector plunger remains in the advanced position until the chuck jaws automatically close, and then retracts to the relieved position.

The machining cycle starts with the Front Carriage and Overhead Slide tools approaching the work piece in rapid traverse. They then slow down to feed and finally return to the starting position in rapid traverse. Upon completion of the machining, an automatic work catcher swings forward, the chuck jaws are retracted and the work piece is ejected into the iron hand by means of the spring-loaded work ejector shown in the line drawing. The work catcher is then retracted and the finished piece drops into the unloader chute at the rear of the machine.

The entire operation is fully automatic, and a production of 147 pieces per hour is easily maintained. Our engineers are at your service to solve your automatic machining problems. Write for Bulletin N50E.

SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

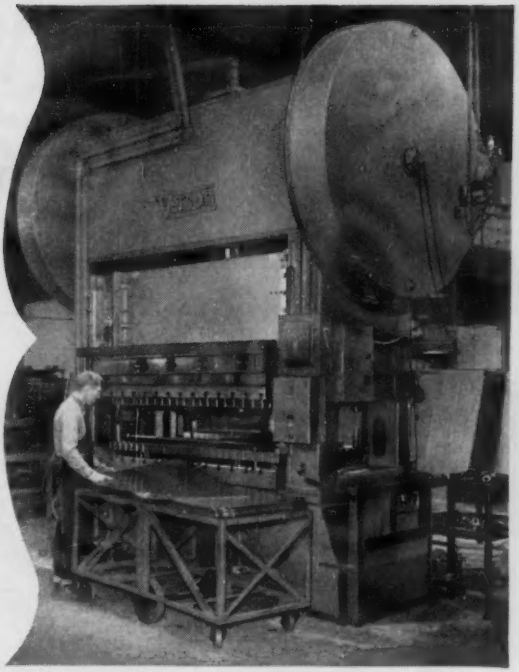



## PRODUCTION COSTS ARE LOWER WITH *Lo-swing*

# 150 TON

Verson

# DOUBLE CRANK PRESS



## forms eight 20-gauge steel furnace side panels per minute

An average of sixteen hours a day, six days a week, this Verson 150 ton Press performs one blanking and two forming operations on 20-ga. cold rolled steel. Blanking or forming is performed on eight gas furnace cabinet side panels for Lennox Industries, Columbus, Ohio, every minute that this versatile Verson Double Crank Press is in operation.

Production dependability is built into *every* Verson Press. More than thirty years of "know-how" and the most modern facilities available enable us to build presses to meet the most rigid requirements.

*Put Verson facilities to work for you!* Send an outline of your production problems today . . . we will be happy to provide specific recommendations.

Verson

ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

**VERSON ALLSTEEL PRESS CO.**

9310 S. Kenwood Avenue, Chicago 19, Illinois
So. Lamar at Ledbetter Drive, Dallas, Texas

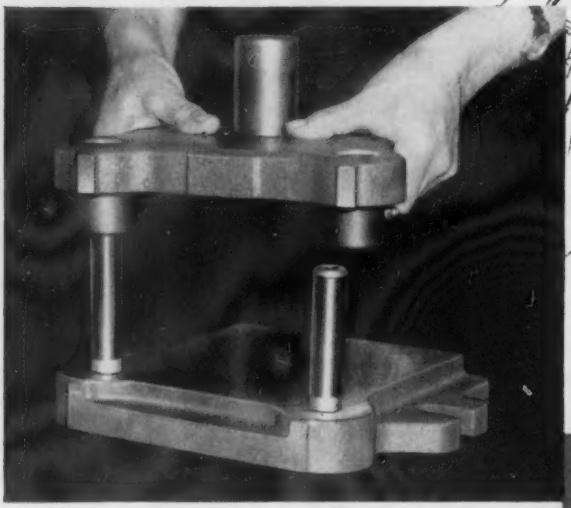
MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TRANSMAT PRESSES
TOOLING • DIE CUSHIONS • VERSON-WHEELON HYDRAULIC PRESSES

For more data circle 218 on Reader Service Card

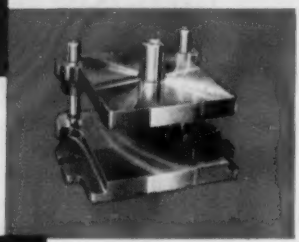
NEW

# Easy Punch Holder Removal

## ON NEW DANLY DIE SETS



Danly's leadership in die set design is seen in another improvement . . . easier removal of punch holders. Standard Danly Die Sets are assembled with one post a half-inch longer than the length specified . . . thus, the punch holder swings free before binding can occur.






**complete new "leadership line" catalog**

More than 200 pages provide you with complete design information, easier selection of die sets and supplies. Write for your copy today!

**DANLY MACHINE SPECIALTIES, INC.**

DANLY

2100 So. Laramie Ave.
Chicago 50, Illinois

For more data circle 219 on Reader Service Card

*do your operators have this*

# *Time Saver*

*to help cut machining costs on stub boring operations?*



SET No. 11 ILLUSTRATED
WEIGHT 350 POUNDS

## SUPER MICROMETER-ADJUSTABLE STUB BORING TOOL SETS

- 1¼ to 8″ Bore Range in 7 Tools
- Eliminate "cut and try" boring
- Precision adjustment to .0001″
- Reduce setup and tool changes

Your operators always have the right tooling answer at their fingertips—for cutting costs and improving accuracy on non-repetitive boring—when you provide them with Davis Stub Boring Tool Sets. Then time lost at the tool crib is ended. For without once leaving their machines, they can bore from 1¼ to 8 inches, pencil bore from ⅜ to 1¼ inches and do light, extended boring up to 13 inches.

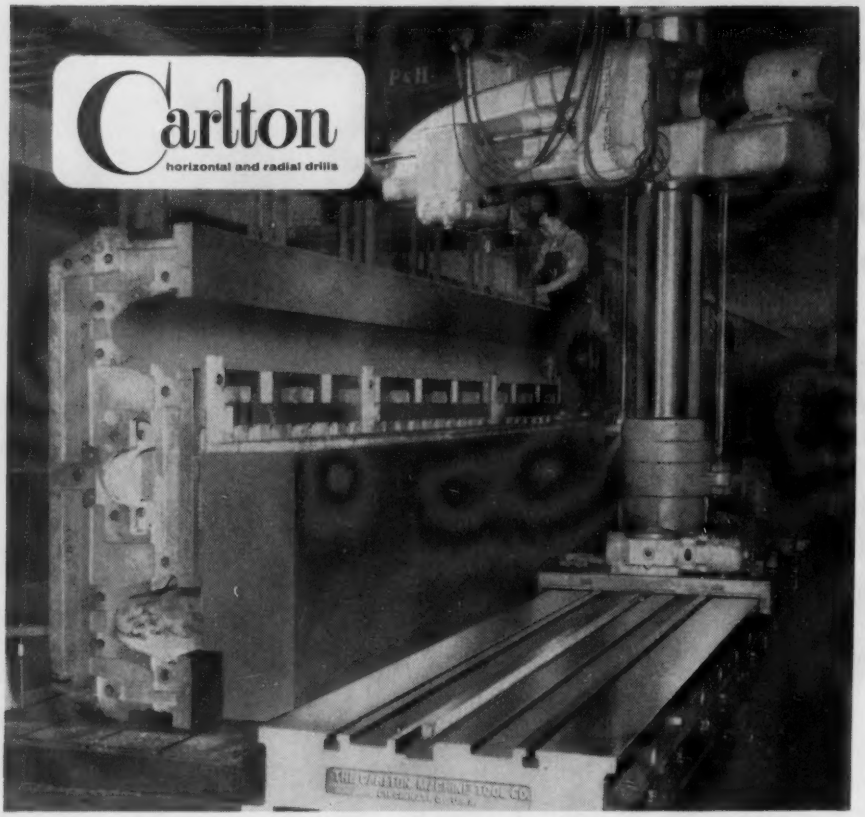
Highest precision and fine finish are assured by Davis Super Micrometer-Adjustable mechanisms used in all seven basic tools in each set. It provides a wide range of cutter adjustments to limits of .0001″ by simply setting the micrometer screw's dial head at the desired reading. Exceptionally rugged construction makes Davis tool sets ideal for either rough or finish boring operations. Learn how this modern tooling idea can save money in your shop.

*Write today for Davis Bulletin DB-50.*

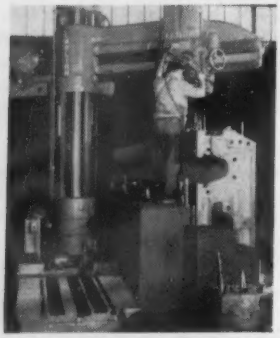
***10 DIFFERENT STANDARD SETS AND MANY MODIFICATIONS READILY AVAILABLE***

**DAVIS**

**BORING TOOL DIVISION OF**
**Giddings & Lewis Machine Tool Co.**
**Fond du Lac, Wisconsin**




## K&T likes Carlton's hole drilling mobility and accuracy

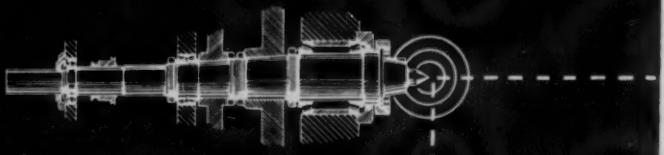


This Carlton radial drill really "gets around" at Kearney & Trecker Corp., Milwaukee. A special sliding bed plate brings Carlton's hole drilling efficiency to bear over the entire length of this enormous 23-foot long K&T milling machine base. It drills 216 holes at one setting without the necessity of lifting so much as an ounce of its 12 tons. Think what this special Carlton mounting means in time, energy and money saved!

And this ingenious mobility means even more when you add to it the many other advantages of Carlton radial drills: low-hung drive, super-precision column clamp, 3-unit power clamping, positive tooth feed clutch and easy, economical maintenance. Arm lengths from 3 feet to 12 feet, column diameters from 9" to 26". Send today for descriptive bulletin. The Carlton Machine Tool Co., Cincinnati 25, Ohio.

For more data circle 221 on Reader Service Card

# Cincinnati Sub-ZEROing in FOR ACCURACY



Shrink fit assembly assures maximum rigidity for spindle bearing raceways of new LeBlond 32 inch 4-bearing spindle.

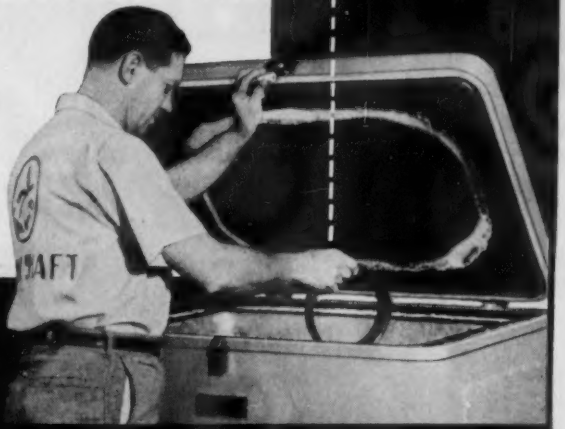
To assure maximum accuracy for every turning operation, The R. K. LeBlond Machine Tool Company utilizes a Cincinnati Sub-Zero Industrial Chilling Machine in shrink fit assembly of spindle bearing raceways.

This internationally known lathe manufacturer mounts the spindles of its heavy duty lathes in precision tapered roller bearings which run in close tolerance steel raceways. Shrink fit assembly assures that raceways will fit tightly in headstock, perfectly aligned for true spindle operation. In addition to raceways, many other vital components are chilled with Cincinnati Sub-Zero equipment at R. K. LeBlond, in stabilization as well as assembly operations.

A new catalog on the complete line of Cincinnati Sub-Zero equipment for industrial and laboratory use is now available. Write for your free copy or outline your special low temperature requirements.

at

LeBLOND of Cincinnati



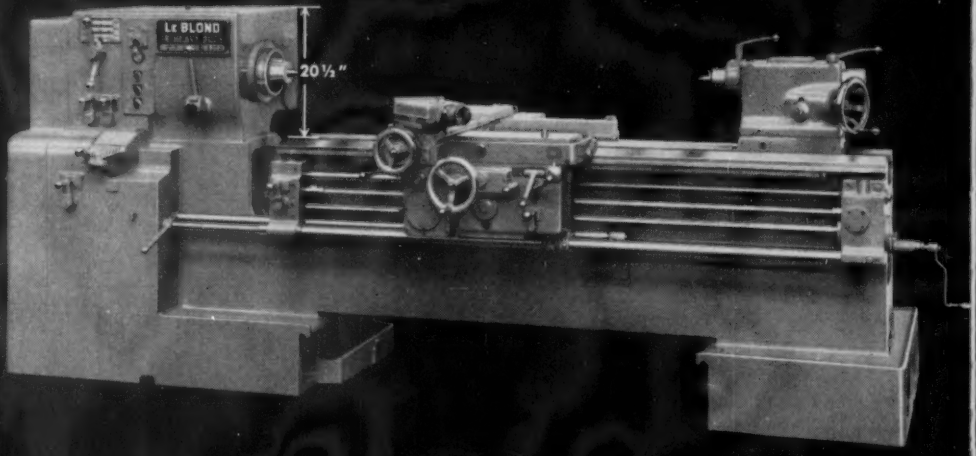
Spindle bearing raceway is placed in Cincinnati Sub-Zero Chilling Unit R-70-10 at LeBlond.

## Cincinnati Sub-Zero Products

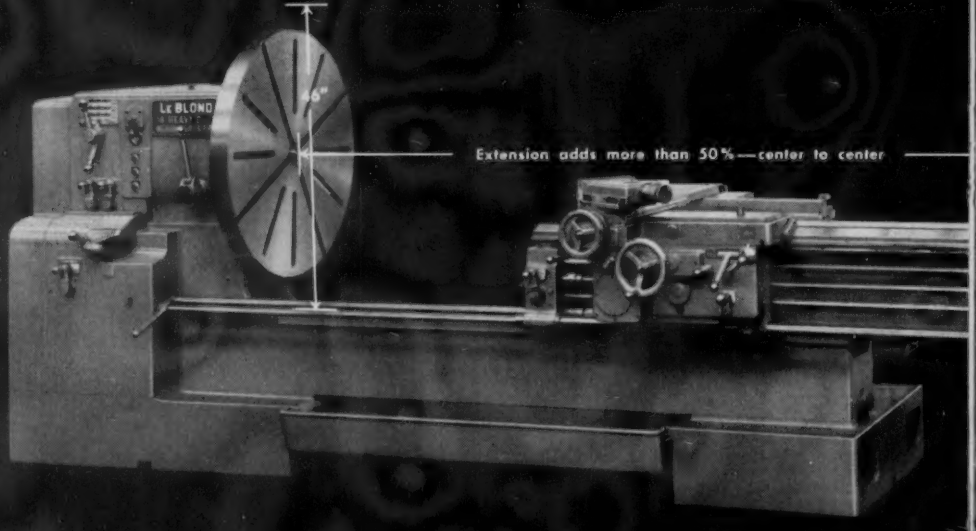
GENERAL OFFICES and PLANT • 3930 S-6 Reading Rd., Cincinnati 29, Ohio

For more data circle **222** on Reader Service Card

# the lathe that gives versatile a new

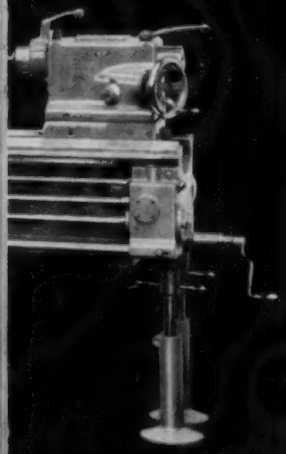



# new LeBlond sliding bed



meaning!

gap lathe



**Here's a lathe that is fundamentally different.** It has a special bed that *slides* open to form a gap—gives you approximately *twice* the normal swing size. Sliding the bed also gives greater bed length, more than 50% greater distance between centers. And, with bed closed it functions as a regular engine lathe.

So, what we mean by a *versatile* lathe is one that actually changes shape to suit your odd-shaped parts. It handles all the usual work, plus a wide variety of large diameter jobs, extra long parts, and combinations of the two. "Swing size" as such is no longer a limitation. For example, here are some of the unusual capacities you can handle on the 16" LeBlond Sliding Bed Gap Lathe:

*Face 38" diameters in one cut*
*Face 45" diameters in two cuts*
*Turn lengths more than 50% greater than normal center distance*
*With extension rest (optional): turn 27½" diameter, 13¼" length*
*With Full-Swing turning attachment (optional):*
*turn 45" diameter almost full length of gap*

Other important features of the new LeBlond 16"/38" SBG Lathe include new spindle bearing design for high-speed turning, combination gear-belt drive headstock, 18 geared speeds, 9 timing belt-driven speeds from 8 to 2000 rpm, spur gear design, four-way rapid traverse, one-piece apron, totally enclosed quick change box, hardened and ground steel bedways, thrust-lock tailstock.

If you have a variety of parts to turn—particularly the unpredictable extremes you encounter in maintenance and job shop work—the LeBlond SBG may well be the answer. An economical answer, too! SBG's come in 4 sizes: 16"/38", 25"/50", 32"/60" Heavy Duties and the 17"/28" Regal. Like all LeBlonds they are built in every engineering detail to give you long dependable service.

Whatever your turning needs, there's a lathe in LeBlond's complete line to do the job. 76 different models to choose from. Call your LeBlond Distributor or write today.

**. . . cut with confidence**

**LeBLOND** *of Cincinnati*

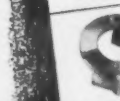
**THE R. K. LEBLOND MACHINE TOOL COMPANY**
**CINCINNATI 8, OHIO**

*World's largest builder of a complete line of lathes for more than 69 years*

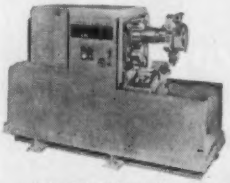
# WARNER & SWASEY 2AC AUTOMATICS

## pay for themselves with one year's savings at Thew Shovel Company

**PRODUCTION RECORD**

| PART | PART NAME | OLD TIME | NEW TIME | MONTHLY TURNOVER | % SAVINGS |
|---|---|---|---|---|---|
|  | Pinion | .280 hours | .087 hours | 100 | 69.0% |
|  | Roller | .392 hours | .087 hours | 2000 | 77.8% |
|  | Sprocket | .376 hours | .177 hours | 175 | 52.4% |
|  | Roller | .373 hours | .126 hours | 447 | 66.2% |
|  | Roller | .372 hours | .141 hours | 109 | 62.2% |
|  | Spacer | .074 hours | .039 hours | 770 | 47.2% |
|  | Box | .431 hours | .193 hours | 108 | 55.6% |
|  | Box | .504 hours | .231 hours | 36 | 54.0% |

Cost savings from 47% to 77%! That's the production record of two Warner & Swasey 2AC Automatics on small and medium lot work at Thew Shovel Co., Lorain, Ohio. Annual dollar savings exceed the cost of both machines plus tooling! On small and medium lot work these automatics can undoubtedly return substantial savings for you. To discuss their application to your work, call in our Field Engineer.



**1 AC CHUCKING MACHINE**
8" or 10" Chuck—6" Working Stroke

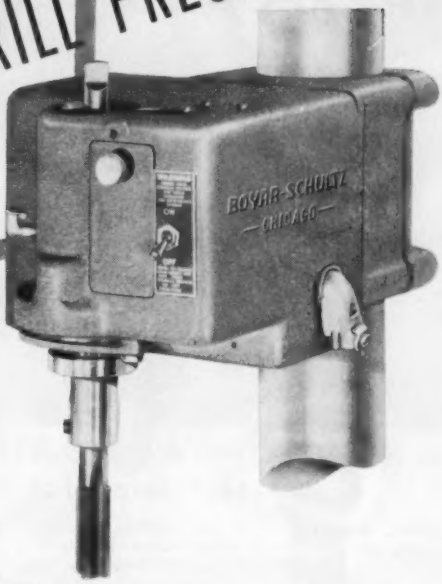
**2 AC CHUCKING MACHINE**
10" or 12" Chuck—9" Working Stroke

WARNER & SWASEY
*Cleveland*
PRECISION MACHINERY SINCE 1880

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS ... WITH A WARNER & SWASEY

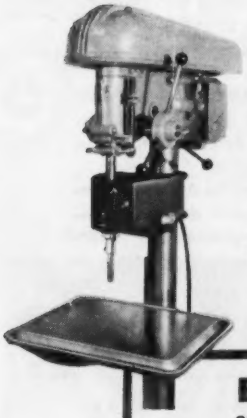
For more data circle **225** on Reader Service Card

# YOU GET MORE FROM YOUR DRILL PRESS *with*




## Boyar-Schultz LEAD SCREW TAPPING ATTACHMENT

***Change Your Ordinary Drill Press to a Precision Tapping Instrument in Minutes*** — your drill press, it makes an efficient Tapping Attachment that can produce any thread including Class 4.



No special skill required for operation. Anyone familiar with a drill press can consistently produce accurate threads.

Foot control switch leaves hands free for loading work. Built in reversing switch actuates drill press motor, eliminating need for any intermediate reversing device.

Long, trouble-free life of bronze nut and ground thread Lead Screw is assured, because of their generous 1¾" diameters.

Extreme accuracy in control of tapped hole depth is assured by electrically controlled reversing switches.

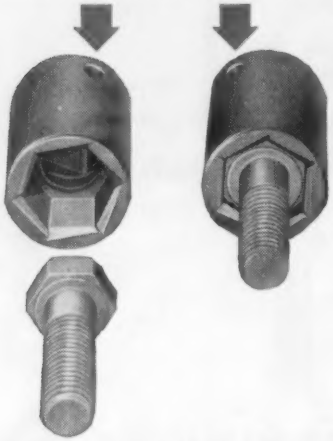
All taps up to ⅞" diameter usable with standard adapter bushings. Adapters for taps 15/16" to 2" available on special order.

**BOYAR-SCHULTZ CORPORATION**
**2020 South 25th Avenue, Dept. TA, Broadview, Illinois**

For more data circle **226** on Reader Service Card

# APEX *"fast lead"* SOCKETS

**SOCKET AND NUT FULLY ENGAGED IN 1/6TH OF A TURN!**



***the socket that's "on" in a split second!***

Put an Apex "fast lead" impact socket on one of your power tools and turn on the power. Now, with the tool running, bring it right down on the nut, without the slightest hesitation. There! . . . the socket is "on" in one smooth, uninterrupted motion, fully engaged almost instantly upon contact! And you can do the same thing on nut after nut, without ever stopping and starting the tool.

Continuous, full-speed operation of power tools is possible only with Apex "fast lead" impact sockets. Whether you use single tools or multiple units, your assembly work will be completed in less time, at lower cost, with these new Apex sockets working for you.

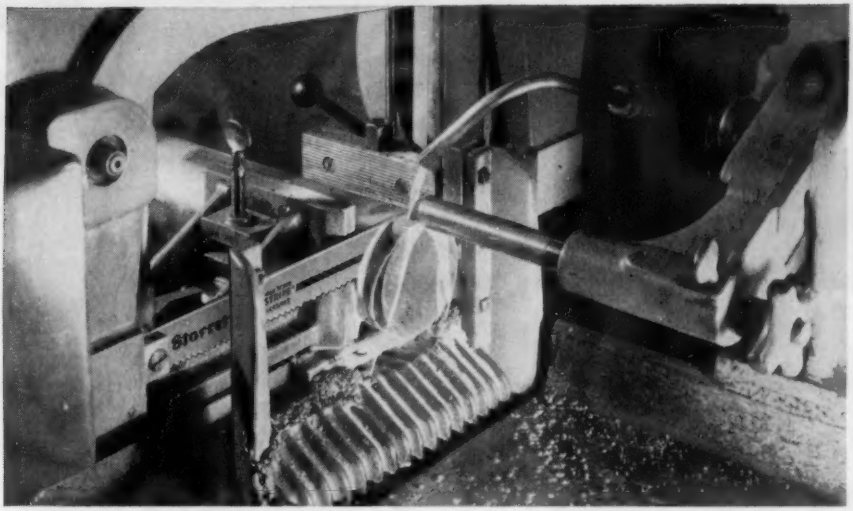
Apex "fast lead" impact sockets are available with hex broached openings from ⅜" to 1". These, and over 5,000 additional Apex stock nut running tools are described in our Catalog 29-R. Write, on your company letterhead please, for your copy.

*Ask* APEX *for the answer to your nut running problem!*

**THE APEX MACHINE & TOOL COMPANY**

1027 S. Patterson Blvd. • Dayton 2, Ohio

For more data circle **227** on Reader Service Card



# NEW STARRETT HACKSAW BLADES

## production-proved to cut faster, last longer

From the Metallurgical and Production Testing Laboratory of the "World's Greatest Toolmakers" come three new hacksaw blades . . . each with special characteristics for faster, easier cutting and longer blade life on a wide range of cutting assignments. To make it easy for you to select the right blade for any job, they are distinctively color-identified and have easy-to-remember names.

Starrett REDSTRIPE® SM Power and Hand Blades, the yellow blades with the distinctive *red* stripe, are specially tempered for cutting hard materials with heavier feeds, higher speeds.

Starrett GREENSTRIPE SAFE-FLEX® Welded Edge Power Blades are double welded, shatterproof, safer, straighter-cutting, longer-lasting. Especially recommended for tough alloy steels, multiple cutting and interrupted cuts. Easily identified as the yellow blades with the *green* stripe. Hand blades also available.

Starrett BLUESTRIPE® High Speed Power and Hand Blades are specially heat treated for high speed production sawing of hard-to-cut metals . . . also recommended for general purpose cutting. Ask for the yellow blade with the distinctive *blue* stripe.

Starrett also makes a complete line of hole saws, band saws, and band knives — all available through your industrial distributor, a convenient and reliable source of supply. Ask him for the new Starrett Saw Catalog or write Dept. MD, The L. S. Starrett Company, Athol, Mass., U. S. A.

Buy THROUGH YOUR INDUSTRIAL DISTRIBUTOR — Prompt delivery. Dependable service. Quality products.

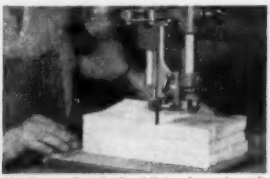
**Starrett**

SINCE 1880
WORLD'S GREATEST TOOLMAKERS

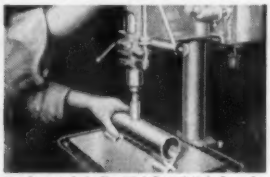
MECHANICS' HAND MEASURING TOOLS AND PRECISION INSTRUMENTS
DIAL INDICATORS • STEEL TAPES • PRECISION GROUND FLAT STOCK
HACKSAWS • HOLE SAWS • BAND SAWS • BAND KNIVES



Use Starrett Production-Proved Band Saws for cutting metal, wood, plastics, etc.



Use Starrett Fast-Kut Band Knives for cutting soft or fibrous materials. 3 types, all sizes.



Use Starrett Safe-Flex High Speed Hole Saws for cutting clean, round holes in any material.

See the STARRETT EXHIBIT—SPACE 919—NATIONAL METAL SHOW

For more data circle 228 on Reader Service Card

# "I FORGOT HOW TO SHUT IT OFF!"*




## *"Thanks, Herman, that's just the point: you don't have to shut the A.M.L. down!"

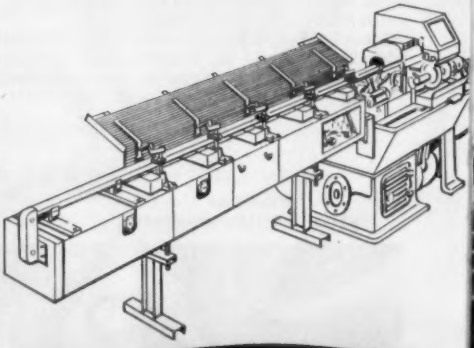
**Right! Lipe Automatic Magazine-Loading Bar Feed keeps right on running, smoothly and perfectly, upping your production . . . cutting your costs.**

Automatically feeds bar stock, rods or tubing continuously, independently of operator.

Eliminates costly feed finger problems . . . feed outs . . . adjustments . . . replacements. Approximately 5 minutes to set up A.M.L. for any size run.

No jamming of remnants; no cutting air; no limit on feed length nor selective stock length requirement.

**SEND TODAY for FREE folder and complete details how A.M.L. can increase your production and profits.**



Lipe-ROLLWAY
CORPORATION
SYRACUSE 1, N.Y.

Manufacturers of Automotive Clutches and Machine Tools

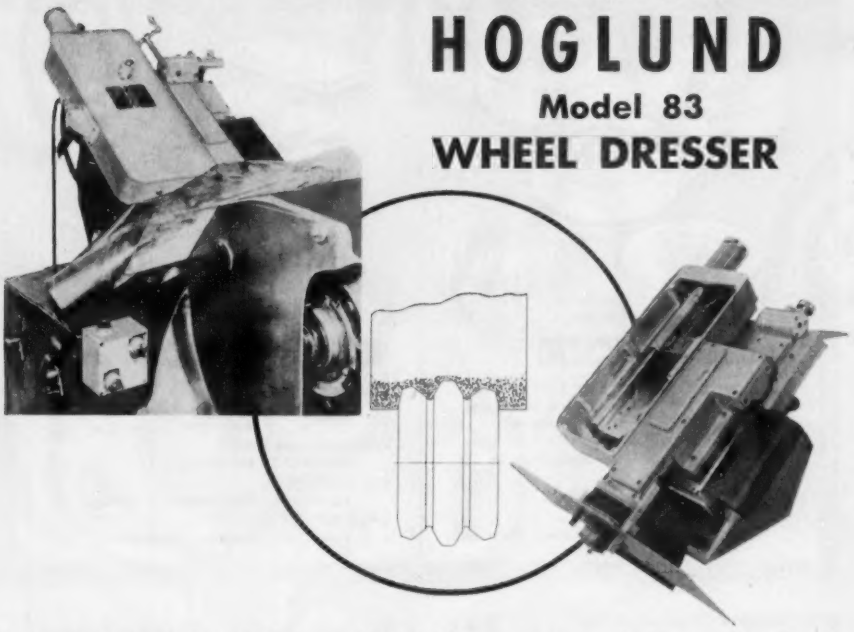
# TENTHS ACCURACY ON ANY COMPLEX CONTOUR

with the new

## HOGLUND

**Model 83**

**WHEEL DRESSER**



Instead of single template bars, Model 83 uses a pair of enlarged synchronized templates to obtain complex contours never possible before.
It will dress any angle on the grinding wheel, perpendicular as well as horizontal. If the diamond can enter into the profile, the profile can be dressed. Here is perfect contour grinding accuracy through correct dressing of abrasive wheels practically eliminating the need for skilled operators.

***Write for folder.***

**HOGLUND ENGINEERING & MANUFACTURING CO., INC.**

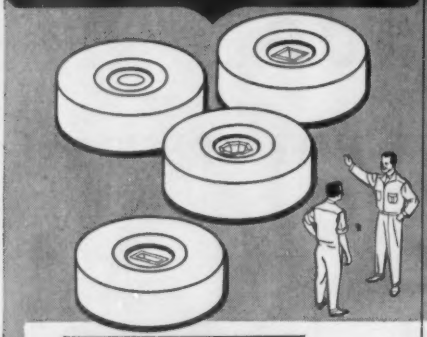
**341 SNYDER AVE., BERKELEY HEIGHTS, NEW JERSEY**

For more data circle **230** on Reader Service Card

# A New and Better Chrome Carbide

# CARMET Grade CA-815

## FOR HOT EXTRUSION DIES



**BETTER RESULTS**

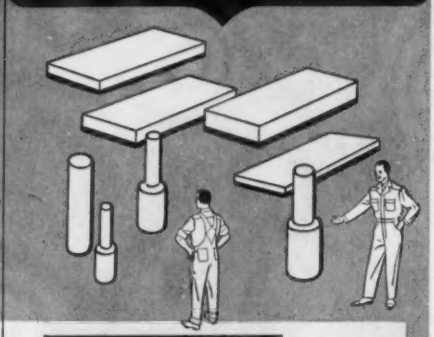
**BETTER DIE LIFE**
because of . . . High resistance to oxidation at elevated temperatures.

**BETTER SIZE CONTROL**
because of . . . Excellent wearability.

**BETTER BAR FINISH**
because of . . . High hot hardness.

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because of . . . Less affinity towards other metals.

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**MORE ACCURATE GAGING**
because of . . . Coefficient of expansion close to that of steel.

**EXCELLENT SURFACE FINISH**
because of . . . Low porosity.

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because of . . . High resistance to corrosion.

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because of . . . Excellent wearability.

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. . . Completely revised, the 16th Edition of the Carmet Catalog contains the latest information on all Carmet grades, and on Carmet blanks, tools, die sections, etc.; also gives details on special preforming and how to order special parts.

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Now for the first time a completely homogeneous chrome carbide is available . . . Carmet CA-815. Grade CA-815 is ideally suited for such operations as the two illustrated above . . . or for *any* application where resistance to corrosion as well as resistance to abrasion are a factor.

Carmet CA-815 is manufactured under controlled conditions. Die and gage makers are assured of complete dimensional accuracy and excellent surface conditions. Only minimum amounts of stock are left for finishing.

For further information on this and other Carmet carbide grades, call your Carmet Engineer . . . or write *Allegheny Ludlum Steel Corporation, Carmet Division, Detroit 20, Mich.*

**For ALL your CARBIDE needs, call**

**Allegheny Ludlum**

WSW 6156

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SINCE 1854

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modern machine shop
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| EDITORIAL ITEMS | | | | | | | | ADVERTISEMENTS | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | First Cover | | | | Second Cover | | | | Third Cover | | | | | | Fourth Cover | | | | | |
| 1 | 26 | 51 | 76 | 101 | 126 | 151 | 176 | 201 | 226 | 251 | 276 | 301 | 326 | 351 | 376 | 401 | 426 | 451 | 476 | 501 | 526 | 551 | 576 | 601 | 626 | 651 | 676 |
| 2 | 27 | 52 | 77 | 102 | 127 | 152 | 177 | 202 | 227 | 252 | 277 | 302 | 327 | 352 | 377 | 402 | 427 | 452 | 477 | 502 | 527 | 552 | 577 | 602 | 627 | 652 | 677 |
| 3 | 28 | 53 | 78 | 103 | 128 | 153 | 178 | 203 | 228 | 253 | 278 | 303 | 328 | 353 | 378 | 403 | 428 | 453 | 478 | 503 | 528 | 553 | 578 | 603 | 628 | 653 | 678 |
| 4 | 29 | 54 | 79 | 104 | 129 | 154 | 179 | 204 | 229 | 254 | 279 | 304 | 329 | 354 | 379 | 404 | 429 | 454 | 479 | 504 | 529 | 554 | 579 | 604 | 629 | 654 | 679 |
| 5 | 30 | 55 | 80 | 105 | 130 | 155 | 180 | 205 | 230 | 255 | 280 | 305 | 330 | 355 | 380 | 405 | 430 | 455 | 480 | 505 | 530 | 555 | 580 | 605 | 630 | 655 | 680 |
| 6 | 31 | 56 | 81 | 106 | 131 | 156 | 181 | 206 | 231 | 256 | 281 | 306 | 331 | 356 | 381 | 406 | 431 | 456 | 481 | 506 | 531 | 556 | 581 | 606 | 631 | 656 | 681 |
| 7 | 32 | 57 | 82 | 107 | 132 | 157 | 182 | 207 | 232 | 257 | 282 | 307 | 332 | 357 | 382 | 407 | 432 | 457 | 482 | 507 | 532 | 557 | 582 | 607 | 632 | 657 | 682 |
| 8 | 33 | 58 | 83 | 108 | 133 | 158 | 183 | 208 | 233 | 258 | 283 | 308 | 333 | 358 | 383 | 408 | 433 | 458 | 483 | 508 | 533 | 558 | 583 | 608 | 633 | 658 | 683 |
| 9 | 34 | 59 | 84 | 109 | 134 | 159 | 184 | 209 | 234 | 259 | 284 | 309 | 334 | 359 | 384 | 409 | 434 | 459 | 484 | 509 | 534 | 559 | 584 | 609 | 634 | 659 | 684 |
| 10 | 35 | 60 | 85 | 110 | 135 | 160 | 185 | 210 | 235 | 260 | 285 | 310 | 335 | 360 | 385 | 410 | 435 | 460 | 485 | 510 | 535 | 560 | 585 | 610 | 635 | 660 | 685 |
| 11 | 36 | 61 | 86 | 111 | 136 | 161 | 186 | 211 | 236 | 261 | 286 | 311 | 336 | 361 | 386 | 411 | 436 | 461 | 486 | 511 | 536 | 561 | 586 | 611 | 636 | 661 | 686 |
| 12 | 37 | 62 | 87 | 112 | 137 | 162 | 187 | 212 | 237 | 262 | 287 | 312 | 337 | 362 | 387 | 412 | 437 | 462 | 487 | 512 | 537 | 562 | 587 | 612 | 637 | 662 | 687 |
| 13 | 38 | 63 | 88 | 113 | 138 | 163 | 188 | 213 | 238 | 263 | 288 | 313 | 338 | 363 | 388 | 413 | 438 | 463 | 488 | 513 | 538 | 563 | 588 | 613 | 638 | 663 | 688 |
| 14 | 39 | 64 | 89 | 114 | 139 | 164 | 189 | 214 | 239 | 264 | 289 | 314 | 339 | 364 | 389 | 414 | 439 | 464 | 489 | 514 | 539 | 564 | 589 | 614 | 639 | 664 | 689 |
| 15 | 40 | 65 | 90 | 115 | 140 | 165 | 190 | 215 | 240 | 265 | 290 | 315 | 340 | 365 | 390 | 415 | 440 | 465 | 490 | 515 | 540 | 565 | 590 | 615 | 640 | 665 | 690 |
| 16 | 41 | 66 | 91 | 116 | 141 | 166 | 191 | 216 | 241 | 266 | 291 | 316 | 341 | 366 | 391 | 416 | 441 | 466 | 491 | 516 | 541 | 566 | 591 | 616 | 641 | 666 | 691 |
| 17 | 42 | 67 | 92 | 117 | 142 | 167 | 192 | 217 | 242 | 267 | 292 | 317 | 342 | 367 | 392 | 417 | 442 | 467 | 492 | 517 | 542 | 567 | 592 | 617 | 642 | 667 | 692 |
| 18 | 43 | 68 | 93 | 118 | 143 | 168 | 193 | 218 | 243 | 268 | 293 | 318 | 343 | 368 | 393 | 418 | 443 | 468 | 493 | 518 | 543 | 568 | 593 | 618 | 643 | 668 | 693 |
| 19 | 44 | 69 | 94 | 119 | 144 | 169 | 194 | 219 | 244 | 269 | 294 | 319 | 344 | 369 | 394 | 419 | 444 | 469 | 494 | 519 | 544 | 569 | 594 | 619 | 644 | 669 | 694 |
| 20 | 45 | 70 | 95 | 120 | 145 | 170 | 195 | 220 | 245 | 270 | 295 | 320 | 345 | 370 | 395 | 420 | 445 | 470 | 495 | 520 | 545 | 570 | 595 | 620 | 645 | 670 | 695 |
| 21 | 46 | 71 | 96 | 121 | 146 | 171 | 196 | 221 | 246 | 271 | 296 | 321 | 346 | 371 | 396 | 421 | 446 | 471 | 496 | 521 | 546 | 571 | 596 | 621 | 646 | 671 | 696 |
| 22 | 47 | 72 | 97 | 122 | 147 | 172 | 197 | 222 | 247 | 272 | 297 | 322 | 347 | 372 | 397 | 422 | 447 | 472 | 497 | 522 | 547 | 572 | 597 | 622 | 647 | 672 | 697 |
| 23 | 48 | 73 | 98 | 123 | 148 | 173 | 198 | 223 | 248 | 273 | 298 | 323 | 348 | 373 | 398 | 423 | 448 | 473 | 498 | 523 | 548 | 573 | 598 | 623 | 648 | 673 | 698 |
| 24 | 49 | 74 | 99 | 124 | 149 | 174 | 199 | 224 | 249 | 274 | 299 | 324 | 349 | 374 | 399 | 424 | 449 | 474 | 499 | 524 | 549 | 574 | 599 | 624 | 649 | 674 | 699 |
| 25 | 50 | 75 | 100 | 125 | 150 | 175 | 200 | 225 | 250 | 275 | 300 | 325 | 350 | 375 | 400 | 425 | 450 | 475 | 500 | 525 | 550 | 575 | 600 | 625 | 650 | 675 | 700 |

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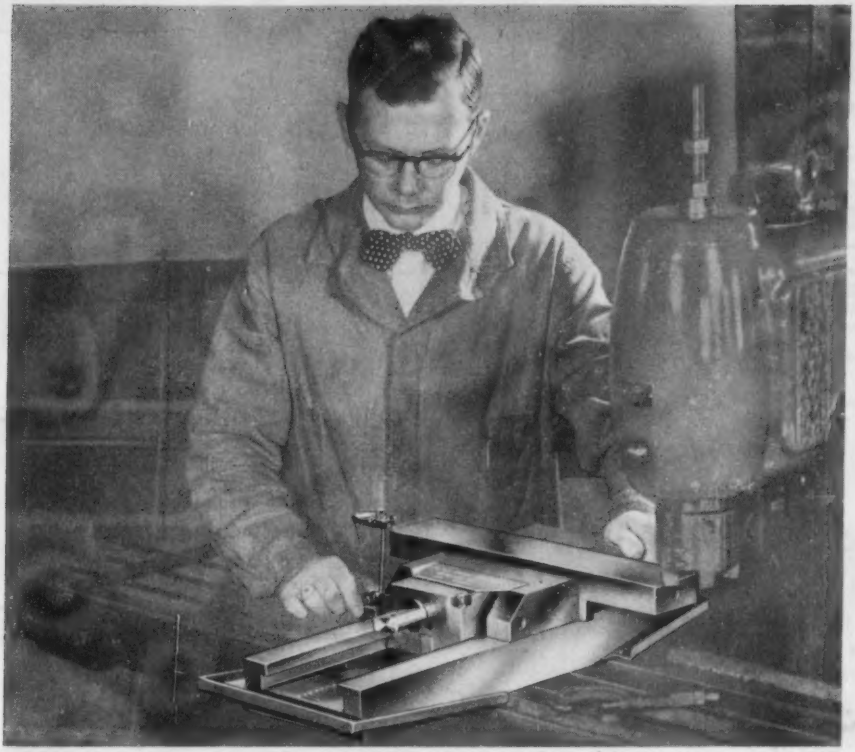
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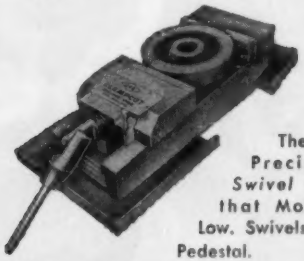


## *"We saved approximately fifty hours of grinding time."*

***stated Paul Schroeder of STRATO TOOL CO., Belleville, N. J., after purchase of a 10" x 12"***

## ● J & S SWIVEL MILLING MACHINE VISE

The job referred to by Strato was the machining of a group of 50 wave-guide mandrels of type 410 stainless steel, size 1⅜" x 2⅞" x 16½" long. Overhang was 4¼" on each side.



**The *only* Precision *Swivel* Vise that Mounts Low. Swivels. No Pedestal.**

"Your vise with the hold-downs repeatedly held size within .0003" to .0005" over the 16½" length. Instead of the usual .010" to .020" allowance for grinding, we were able to bring sizes right down, only having to allow for a skim grinding cut. I estimate we saved approximately fifty hours of grinding time. This saving on one job paid for over half of the cost of your vise," said Mr. Schroeder.

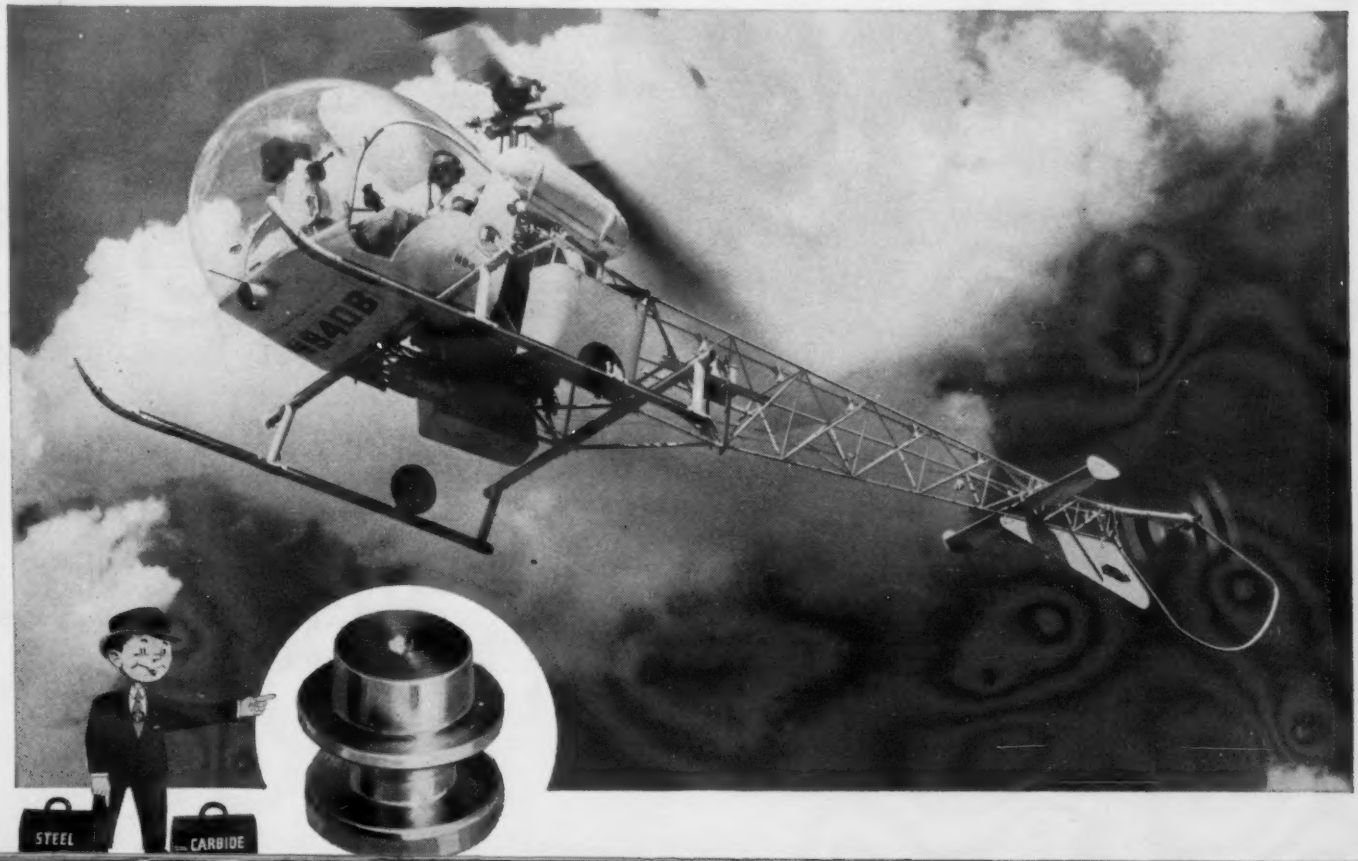
**For complete details on this vise or any other J & S product, write for free literature to:**

WHEEL DRESSERS J&S TOOL CO., INC. SAW CLAMPS • PRECISION VISES • DOWN-HOLDING DEVICES **CLAMPCUT** SINE BARS

**J & S TOOL CO., INC.**

**871 DORSA AVE.**
**LIVINGSTON, NEW JERSEY**

# "Mission accomplished" at Bell Aircraft...with FIRTHITE TXH



# 133% more needle bearing pins per grind

Down Fort Worth way at famous Bell Aircraft Corporation, they made production tests on the *new* FIRTHITE TXH Carbide . . . turning and facing needle bearing pins from SAE 4140 steel.

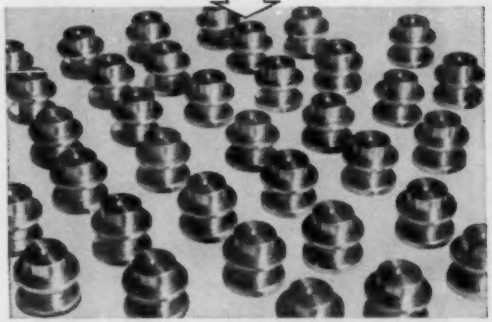
The results speak for themselves:

- 133% more bearing pins per grind.
- More than twice as many pieces per grind as nearest premium grade.
- Seven times more pieces per grind than two other competitive grades.
- Only .007 stock removed to resharpen compared with .025—.035 for competitive grades.

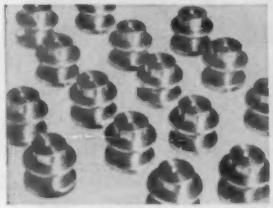
Truly this test proves, as do others all over the country, that FIRTHITE TXH is easily the outstanding carbide in its field . . . a *premium grade* at *no* premium price.

Yes, FIRTHITE TXH is a completely *new* carbide concept . . . a combination of materials and processes designed specifically to do heavy-duty, high-production cutting operations better than they have ever been done before!

You, too, can make important savings, and increase production with TXH. It's available *now* in all standard tips and tools. Try it today.



**FIRTHITE TXH—35 PER GRIND**



Competitive Grade A—15 per grind



Competitive Grades B & C—4-5 per grind

R 316

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High Speed Steels
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High Temperature Cermets
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FIRTH STERLING TRADE MARK

**Firth Sterling**

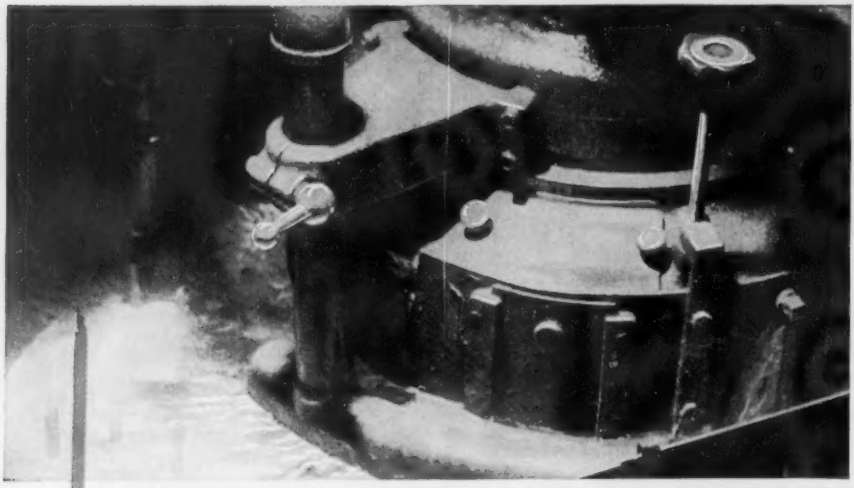
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For more data circle **234** on Reader Service Card



# for better grinding... K-7

K-7 gives superior results in grinding all steels, cast and malleable irons, titanium, carbon, rubber, ceramics and plastics (not recommended for non-ferrous metals). This all-chemical water soluble liquid concentrate is transparent and colorless in solution, is non-foaming and runs absolutely flat under all conditions. Low pH (alkalinity) makes it easy on the skin. K-7 solutions do not load work wheels, and this means fewer dressings, longer wheel life and a true ground finish. Write for further details today.

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BETTER PRODUCTS FOR BETTER METALWORKING

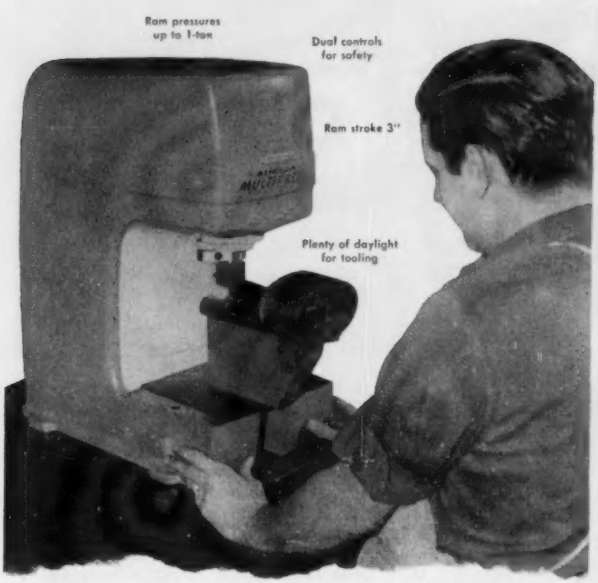
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# HOW TO SIMPLIFY PRESSING OPERATIONS

**...assembling – riveting – marking – trimming – broaching – punching**






**ELIMINATES SCRAP** in assembly of bearings at rates of 200 to 300 per hour.



**STRIPS CONTACTS** on electrical components at speed of 600 parts per hour.



**PREVENTS BREAKAGE** of plastic units in riveting of metal inserts.

easily tooled for any pressing job

**DENISON 1-ton hydraulic *MULTIPRESS*®**

***now gives you:***

***More production per hour*** with extremely fast cycle time . . . without kicking pedals or pulling levers.

***Uniform quality production*** with accurately duplicated ram pressure on every stroke.

***Maximum safety*** with interlocking controls to prevent accidental tripping.

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**DENISON HydrOILics**

HYDRAULIC PRESSES • PUMPS • MOTORS • CONTROLS

**MAIL DATA FORM**
**to see how you can benefit**

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**MY APPLICATION**

| *Type of Operation* | *Type of Material* |
|---|---|
| ☐ Assembling | ☐ Steel |
| ☐ Marking | ☐ Brass |
| ☐ Punching | ☐ Aluminum |
| ☐ Trimming | ☐ Plastic |
| ☐ Broaching | ☐ Glass |

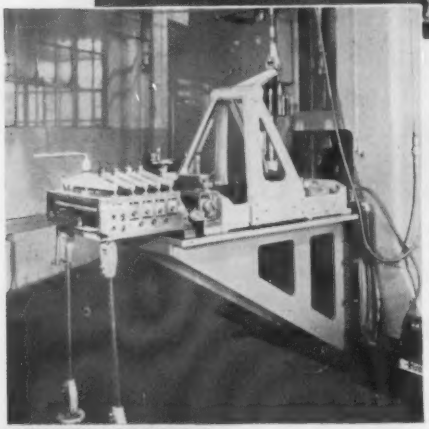
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*City* _____ *Zone* ____ *State* _____
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*Position* _____

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# For Small Stampings . . . For Large Stampings Equip your Presses with U.S. SLIDE FEEDS





Both illustrations directly above show the SF-24-24 U. S. Slide Feed, suitable for material up to 24 inches in width, feeding length adjustable up to 24 inches, with Plain Straightener mounted on a Verson Straight Side Press. To the left is shown the smallest U. S. Slide Feed, Model SF-00, suitable for material up to 1½ inches in width, feed length up to 1 inch.

For the accurate automatic feeding of coil stock up to 24 inches in width into punch presses, there is a size Slide Feed to suit your particular requirements. The illustrations show the largest size, Model SF-24-24, suitable for material up to 24 inches in width and feeding length adjustable up to 24 inches mounted on a Straight Side Verson Press at Federal Pacific Electric Company in Newark, N. J., and the smallest U. S. Slide Feed, Model SF-00, suitable for material up to 1½ inches in width, feeding length adjustable up to 1 inch.

U. S. Slide Feeds are generally recognized as the most accurate automatic feeds on the market for the feeding of coil stock into punch presses. They are designed so that the length of feed is controlled between positive stops, providing the consistent accuracy so necessary in progressive die operations. U. S. Slide Feeds together with U. S. Stock Straighteners, Coil Cradles, and other Press Room Equipment convert your presses into automatic machines.

*If you use presses of any size in your production write for Bulletins 80-S and 90-S illustrating and describing the complete line of U. S. automatic pressroom equipment.*

## U. S. TOOL COMPANY, Inc.

AMPERE (East Orange) NEW JERSEY

Builders of U. S. Multi-Slides — U. S. Multi-Millers

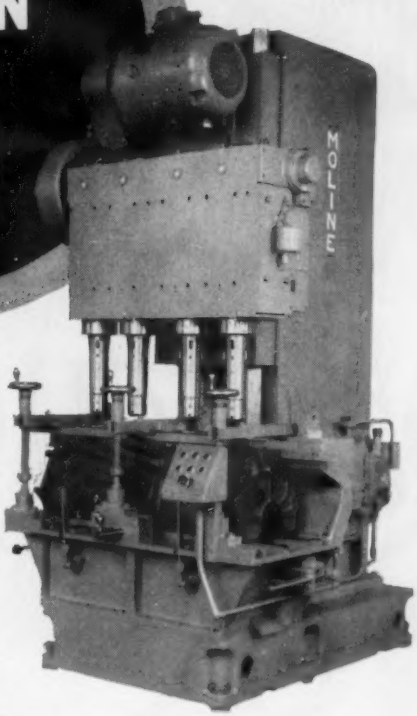
U. S. Automatic Press Room Equipment — U. S. Die Sets and Accessories

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*naturally...they come to*

# LEHMANN-FULTON *for* PRECISION BORING TOOLS

PHOTO COURTESY MOLINE TOOL CO.




Moline Tool Company received an order to make a four spindle hydraulic rail feed cylinder boring machine you see at the right.

Like so many other manufacturers of precision products, Moline profited by the skill of veteran Lehmann-Fulton engineers and machinists who supplied the necessary boring tools.

Let Lehmann-Fulton's 37 years of experience, design and supply your boring tool needs.

Results: less machining time... more accuracy... lower cost boring operations...elimination of costly, tool setting errors.

Write today for our new catalog ... no obligation, of course.

**LEHMANN BORING TOOL**
DIVISION OF FULTON IRON WORKS COMPANY
4235 DUNCAN AVE. • ST. LOUIS 10, MO.

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# New Accuracy New

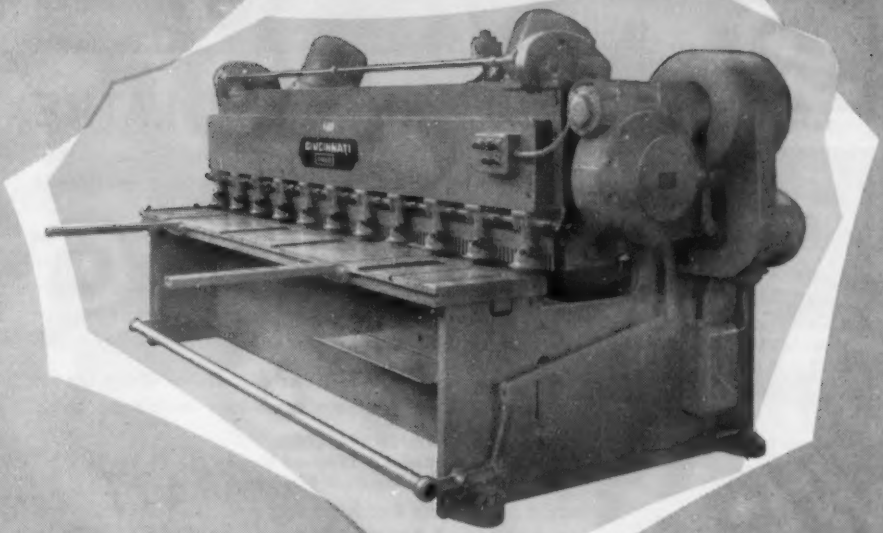
# New Quiet




**THE CINCINNATI SHAPER CO.**

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

# Cincinnati Shears

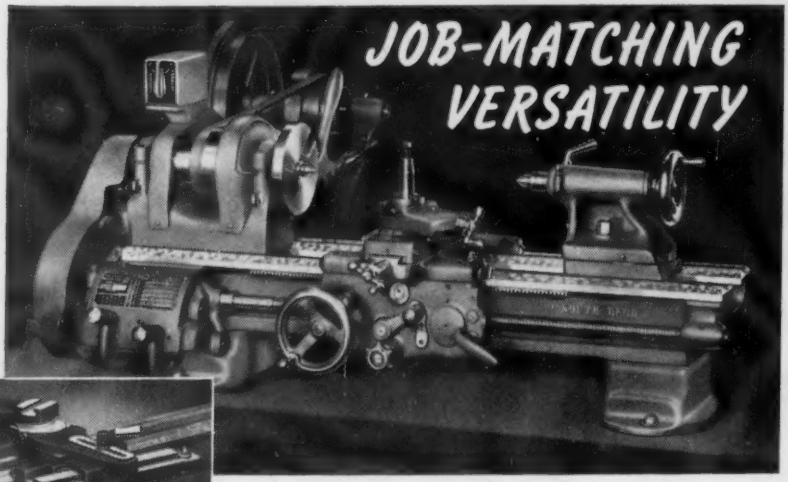



New design in Cincinnati Shears has brought a new quiet and accuracy in performance.

New low rake has increased accuracy—producing blanks to very close tolerances with straight clean edges.

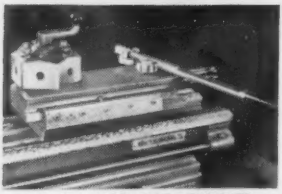
The new design, powerful hydraulic holddowns operate quietly and assure full pressure for holding. Front control of the power back gauge saves time in operation and gives a positive, accurate, easy control of gauging from operator's working position.

Write for catalog S-7R.

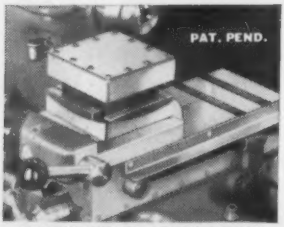





TAPER ATTACHMENT



HANDLEVER BED TURRET




SQUARE TURRET TOOL BLOCK

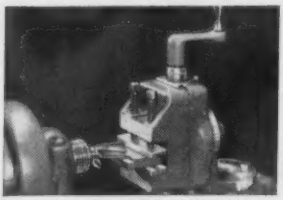
# SOUTH BEND 9" LATHE

Here's a lathe that cuts machining costs on small precision parts. Its wide ranges of speeds, power feeds and threading feeds provide versatility for practically every job. Numerous job-simplifying attachments make the scope of its work even greater. This enables you to better match the lathe to your jobs. It results in faster operations, greater accuracy, quicker set-ups and the release of heavier machines for heavier work.

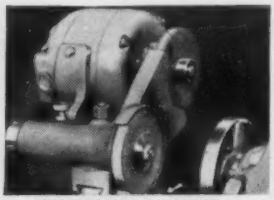
Write for catalog or call our distributor listed under "Machine Tools" in your classified telephone book.

*ILLUSTRATED ABOVE:*
**9" x 3' Model A 12-speed Bench Lathe.** Less electrical equipment, f.o.b. factory..... **$427**

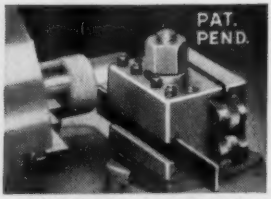
**SOUTH BEND LATHE WORKS**
*Building Better Tools Since 1906*
426 E. MADISON STREET, SOUTH BEND 22, INDIANA



MILLING ATTACHMENT



EXTERNAL GRINDER




UNIVERSAL TOOL BLOCK

For more data circle **241** on Reader Service Card

# Speed-up YOUR CHECKING AND STRAIGHTENING JOBS!




**Anderson**

**HYDRAULIC**

**POWER**

**PRESS**

## PRESSES OF 10-25-50 TON CAPACITY

Built with stationary or traveling ram . . . so sensitive a shaft may be straightened to within .001". Straightens and checks in the same position. Flexible, accurate control valve operated by a hand lever. Manufacturers with straightening, checking, and truing operations that require speed and accuracy find Anderson Power Presses to be the answer to their problems.

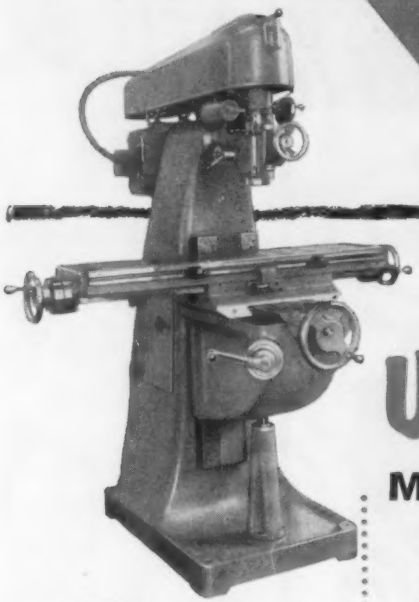
Anderson

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**ANDERSON BROS. MFG. CO.**
**ROCKFORD, ILLINOIS**

For more data circle **242** on Reader Service Card

Choice of hand or power feed head and table



**BALANCED RIGIDITY**

**assures *CERTIFIED ACCURACY**

**in the NEW**

# U.S. Vertical

## MILLING MACHINE

**Balanced rigidity, the key to accuracy for vertical and angular milling operations, is an integral part of the new U. S. Vertical Milling Machine.**

**These U. S. Vertical features provide rigidity for close tolerance work.**

- **Machine weighs 2000 pounds**
- **Extra wide bearing surfaces**
- **Motor mounted behind column, balances weight of head, resists vibration and deflection**
- **Major castings are internally ribbed, normalized, stress relieved, and internally braced**
- **Dovetails are deep and hand scraped**
- **Massive knee, saddle and table**

**Drive by B section V belt**

***Tested 10 Ways!**

The accuracy of each U. S. Vertical Milling Machine is certified. A check sheet accompanies every machine listing 10 exacting operational tests the machine has passed. The check shows allowable tolerances and actual measured tolerances of the individual unit. A new bulletin provides complete specifications and illustrates various accessories available on the new U. S. Vertical Milling Machine. Write for your *FREE* copy today.

**U·S·Burke**
MACHINE TOOL DIVISION

3 Brotherton Road
Cincinnati 27, Ohio

**Manufacturers of:**
Burke Bench Mills, U. S. No. 1 Milling Machine and the radically new U. S. Quartet

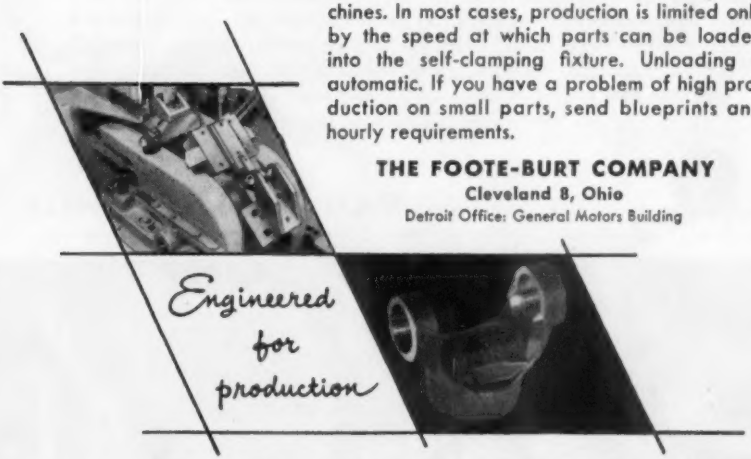
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# To cut machining costs, machine faster with continuous broaching

■ Higher machining production than ever achieved by any other method has been made possible in many cases through the use of the Footburt Continuous Surface Broaching Machines. In most cases, production is limited only by the speed at which parts can be loaded into the self-clamping fixture. Unloading is automatic. If you have a problem of high production on small parts, send blueprints and hourly requirements.

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**Cleveland 8, Ohio**
Detroit Office: General Motors Building



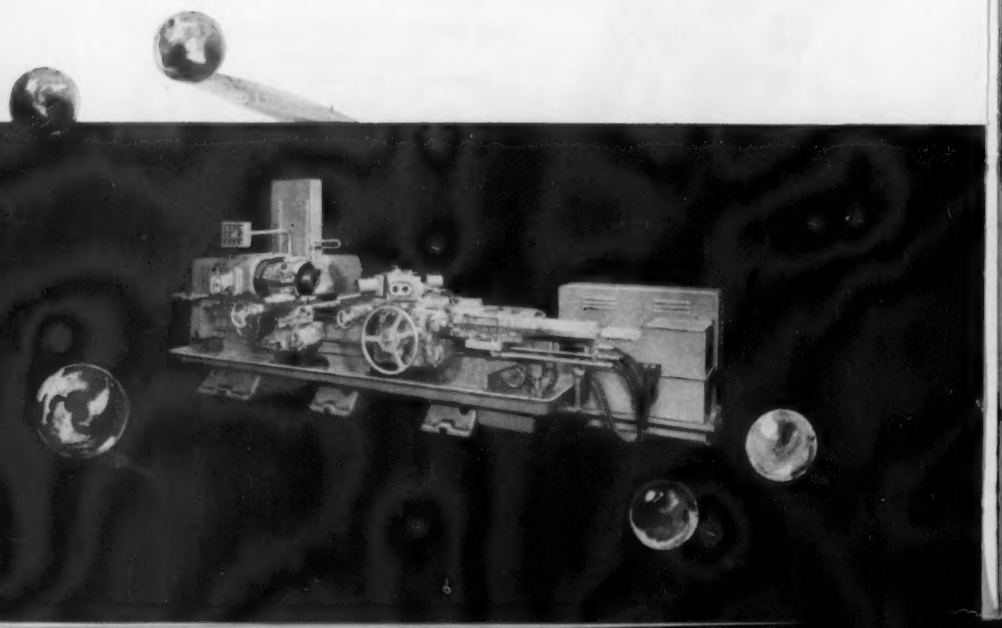

# FOOTBURT

**PIONEERS IN SURFACE BROACHING**

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# CHILD'S PLAY





Speed is not enough! To pay for itself out of reduced operating costs and increased profits, today's machine tool must be:

1. Easy to understand. 2. Child's play to operate.

3. Quick to convert in change-over and re-tooling.

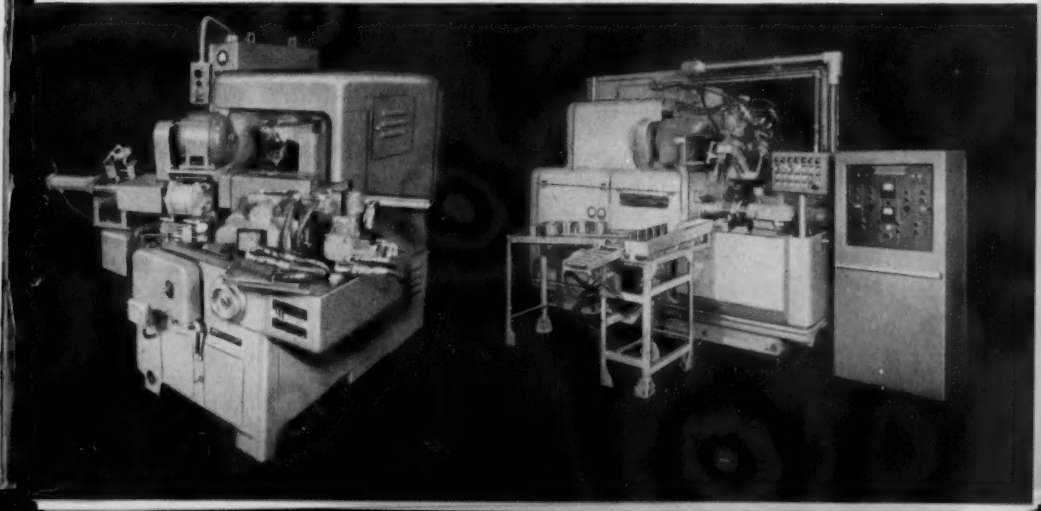
4. Push-button simple to demonstrate in operator training.

Here are a few of the many advanced engineering features which have made today's Jones & Lamson machine tools the most flexible and cost-efficient metal cutting equipment in the industrial world today.

Two-way tracing combined with normal turret lathe operation; Hydra-clutch headstock and Geneva saddle for simple "on the machine" handling; Automatic handling, gaging, chip disposal, sorting, tool adjustment on single spindle automatics; Tape controlled turret lathes for flexibility on long or short run jobs with pre-set tooling, no hand controls; Thread and form grinders with fully automatic handling and machining cycles; Contour grinders controlled hydraulically or optically, and "Automatic thread chasing on standard turret lathes".

**JONES & LAMSON** MACHINE CO • 521 CLINTON ST • SPRINGFIELD, VT.

*Turret Lathes* *Fay Automatic Lathes* *Milling & Centering Machines* *Thread & Form Grinders* *Optical Comparators* *Threading Dies & Chasers*






An almost perfect balance of *toughness, red hardness* and *wear resistance* enables duMont Tool Bits to hold a keener cutting edge longer, gives you a bonus of cutting life in every bit. High speed, ground square and rectangular.

Clip the coupon for full information.

The du MONT CORPORATION,
Greenfield, Mass.

MAIL FREE Tool Bit COMPARISON CHART, CATALOG and PRICE LIST to

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# Meetings

## *Important Meeting Dates*

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

**October 8-12** • National Metal Congress and Exposition, Public Auditorium, Cleveland. Information: American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

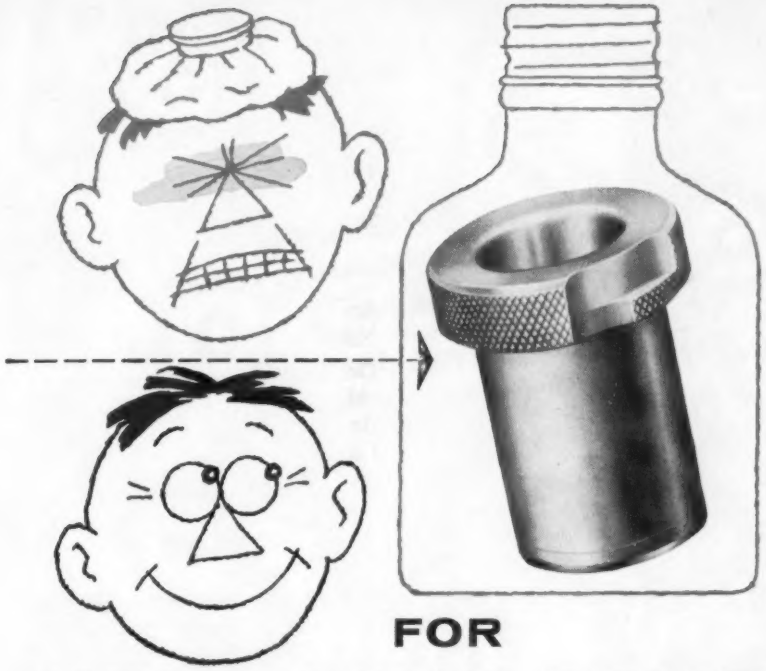
**October 14-16** • American Machine Tool Distributors Association, Annual Meeting, Broadmoor Hotel, Colorado Springs, Colo. Association headquarters: 1900 Arch St., Philadelphia 3, Pennsylvania.

**October 25-26** • American Supply and Machinery Manufacturers' Association, Inc., Industrial Distribution Forum, William Penn Hotel, Pittsburgh. Association headquarters: 2130 Keith Bldg., Cleveland 15, Ohio.

**October 28-31** • American Gear Manufacturers Association, Semi-Annual Meeting, Edgewater Beach Hotel, Chicago. Association headquarters: 1 Thomas Circle, Washington 5, D. C.

**October 31-November 2** • Industrial Management Society, Time and Motion Study and Management Clinic, Hotel Sherman, Chicago. Society headquarters: 35 E. Wacker Drive, Chicago 1, Illinois.

**October 31-November 2** • Gray Iron Founders' Society, Inc., Annual Meeting, The Homestead, Hot Springs, Va. Society headquarters: 930 National City-E. 6th Bldg., Cleveland 14, Ohio.



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# HEADACHE RELIEF!

## DON'T CALL A DOCTOR...USE AMERICAN DRILL BUSHINGS

Yes—for quick relief of major aches and pains, irritation due to inadequate service, and general production headaches, use American Drill Bushings. Complete stocks of American Drill Bushings are on our exclusive distributors' shelves now... ready to go to work for you at a moment's notice.

American gives instant relief with fast service that assures you of the *right* drill bushing *when you want it!*

And...American produces the finest precision drill jig bushings containing extra features such as: Double ground lead for easy pressing into the jig • Radius into the hole—to prevent tool hang-up, wear and breakage • Two way undercut under the head to insure squareness to the jig • 100% concentricity inspection • Internal ground holes to insure straightness • Original 3-D ordering method eliminating confusing code numbers • Patented bushings for plastic tooling • Complete local stocks.

Let American relieve your drill bushing headaches. Get American Drill Bushings NOW!

*American*

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***Different In Every Way!*** New 44 ALUNDUM abrasive (at right in illustration) *looks different* from ordinary aluminum oxide abrasive, with a finer grained surface that denotes greater density and toughness. That's because it's *made differently*, by a special Norton-developed process. And that's why it *performs differently*, with new time-and-money-saving "Touch of Gold" advantages.

## *INTRODUCING...THE NEW*

# 44 ALUNDUM* abrasive




*...most sensational, non-premium abrasive ever developed with new "TOUCH of GOLD" benefits for better, lower cost grinding*

The big news about the new 44 ALUNDUM abrasive is this:

*For a non-premium priced aluminum oxide abrasive, its performance, job range and service life are truly sensational.*

It's a real work-horse abrasive — with extra ruggedness and durability that can take on a lot of tough grinding jobs and come back for plenty more. In more than 1100 tests, plants all over the country have reported that 44 ALUNDUM wheels have these advantages over ordinary aluminum oxide wheels:

LONGER LIFE — COOLER CUTTING
BETTER FINISH — HOLD FORM BETTER
FASTER RATE OF CUT
MORE PIECES PER DRESSING

### *Straight Facts*

New 44 ALUNDUM abrasive is not a cure-all. For example, nothing can replace 32 ALUNDUM abrasive for precision grinding on high speed steel or CRYSTOLON* abrasive for most nonferrous grinding jobs.

*But — on any job where ordinary aluminum oxide abrasive is good, "44" will give results ranging from equal to very much better. And — "44" has a much wider job range.*

Take advantage of this outstanding new abrasive value. See your Norton Distributor for 44 ALUNDUM wheels in the bonds, wheel types and sizes you need. Or write to the nearest district office of NORTON COMPANY, Worcester 6, Mass. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone book, yellow pages. Behr-Manning Company, Troy, N. Y., division of Norton Company. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts.

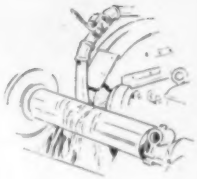
*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

W-1737

***44 ALUNDUM abrasive gives excellent results on many grinding applications***



CENTERLESS



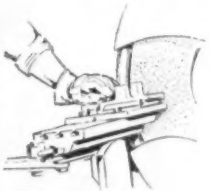
CYLINDRICAL



INTERNAL



SNAGGING



DISC GRINDING



MOUNTED WHEELS

**. . . also a standout for saw gumming, ball grinding and thread grinding.**

**NORTON**

**ABRASIVES**

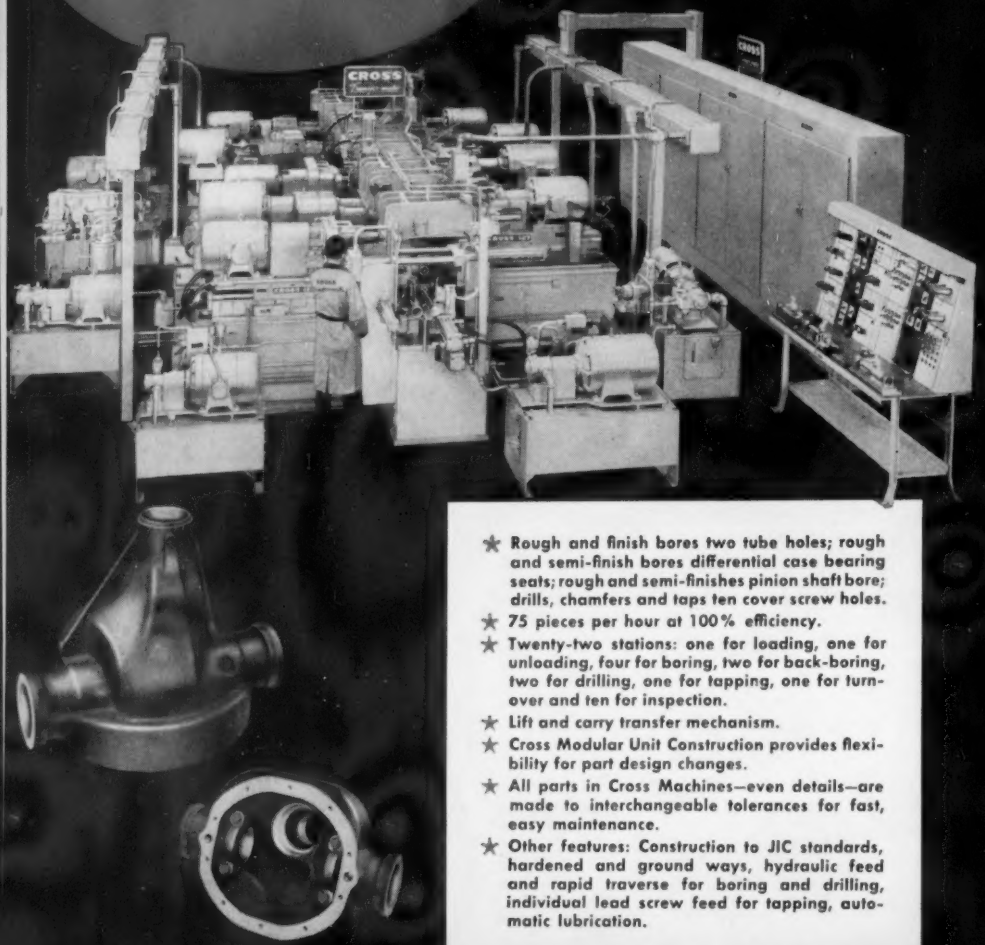
*Making better products... to make your products better*

NORTON PRODUCTS: Abrasives • Grinding Wheels
Grinding Machines • Refractories

BEHR-MANNING PRODUCTS: Coated Abrasives
Sharpening Stones • Behr-cat Tapes

# Bores, Drills Chamfers, and Taps Rear Axle Housings

*Another Transfer-matic by Cross*




- ★ Rough and finish bores two tube holes; rough and semi-finish bores differential case bearing seats; rough and semi-finishes pinion shaft bore; drills, chamfers and taps ten cover screw holes.
- ★ 75 pieces per hour at 100% efficiency.
- ★ Twenty-two stations: one for loading, one for unloading, four for boring, two for back-boring, two for drilling, one for tapping, one for turn-over and ten for inspection.
- ★ Lift and carry transfer mechanism.
- ★ Cross Modular Unit Construction provides flexibility for part design changes.
- ★ All parts in Cross Machines—even details—are made to interchangeable tolerances for fast, easy maintenance.
- ★ Other features: Construction to JIC standards, hardened and ground ways, hydraulic feed and rapid traverse for boring and drilling, individual lead screw feed for tapping, automatic lubrication.

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*First in Automation*

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**modern machine shop**
**431 Main St. Cincinnati 2, Ohio**



**HIGHER SPEEDS! FASTER GRINDING!**

**kipp**

**AIR GRINDERS**

MODEL JA
50,000 R.P.M.
$42.00
IN U.S.A.



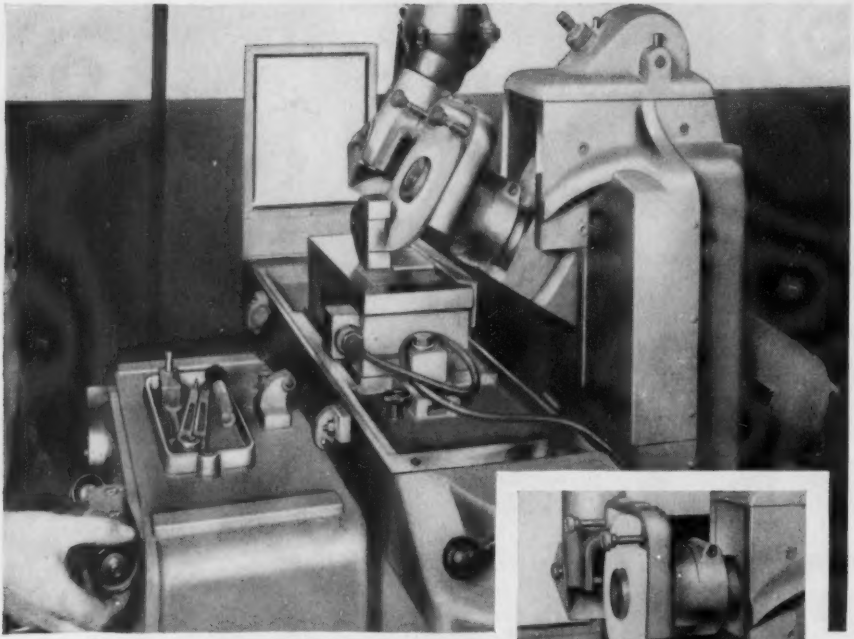
Weight 12 ounces; length 6¾ inches; chuck size ⅛ inch. Wheel guard removed for better illustration.

The RPM's stay up while grinding . . . not only when the grinder runs idle. That means better work—longer wheel life.

High speed grinding with small wheels was a Madison-Kipp development of the late twenties. It was born out of a pressing need in our tool room. Because tool room grinding problems are universal, we believe it will pay you to utilize Kipp grinders in your tool room as generally as we do in our own.

**kipp**

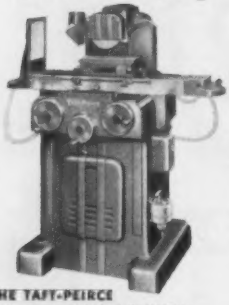
**MADISON-KIPP CORP.**
**208 Waubesa St., Madison 10, Wis., U.S.A.**
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This is the new way — Taft-Peirce angular surface grinding, as compared to conventional side wheel grinding, at right. Workpiece is held on Superpower Electromagnetic Chuck with fine mesh face plate. (Wheelhead cover removed to demonstrate operation.)

# T-P Tilting Wheelhead

## Cuts Setup and Grinding Time in Half!



THE TAFT-PEIRCE
NO. 1 PRECISION GRINDER

Tilting wheelhead is mounted between two pairs of circular dovetail slides, permitting swivelling of the entire spindle about the wheel center — through an arc from horizontal to 30° below center. Spindle can be set to any desired angle to simplify and even eliminate the setups frequently required for difficult grinding operations.

Same workpiece, same operation — but what a difference in time and cost.

Exclusive Taft-Peirce *angular surface grinding* makes it possible to complete a setup and grinding operation in less than half the time required with conventional side wheel grinding. Just set piece on magnetic chuck, dress wheel, and grind! And there's no problem with burrs, working over-size, curved surfacing, or wheel glazing.

All this, plus the extreme accuracy of the No. 1 Precision Surface Grinder. Operators easily grind to .0001", and to .00005", with experience. Surfaces are so smooth they seal without lapping; so accurate, they wring!

See these remarkable features demonstrated — we're sure you'll be convinced of the extra savings this grinder will produce. Contact your local T-P representative or write: Taft-Peirce Manufacturing Co., Woonsocket, R. I.

**THE TAFT-PEIRCE FAMILY...**

- Magnetic Chucks
- Precision Gages
- Air Gages
- Grinding Machines
- Lapping Machines
- Tool-Room Specialties

T P

## TAKE IT TO TAFT-PEIRCE

TAFT-PEIRCE MANUFACTURING COMPANY
WOONSOCKET, RHODE ISLAND

T-P Means TOP Precision

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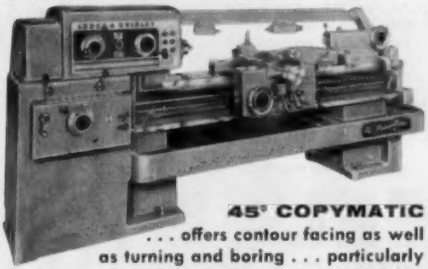
# TAKE YOUR CHOICE . . .




# 45° OR 90° *Powerturn* COPYMATICS
## LODGE & SHIPLEY TRACER CONTROLLED LATHES

Lodge & Shipley produces both these versatile duplicating lathes! Now, choose the type that perfectly suits your production. Speaking of production, these new lathes really produce at low cost. They combine proven advantages of all-hydraulic duplication . . . featuring either 45° or 90° tracing slide . . . with all the new POWERTURN features.

There are 5 new sizes and types of COPYMATICS suitable for your needs. Complete details are available in two new pieces of literature: Bulletin 309, 90° COPYMATIC and Bulletin 310, 45° COPYMATIC. For your copies, address: The Lodge & Shipley Company, 3055 Colerain Ave., Cincinnati 25, Ohio.



**45° COPYMATIC**
. . . offers contour facing as well as turning and boring . . . particularly suited for turning contours involving diameters connected to faces by curves!

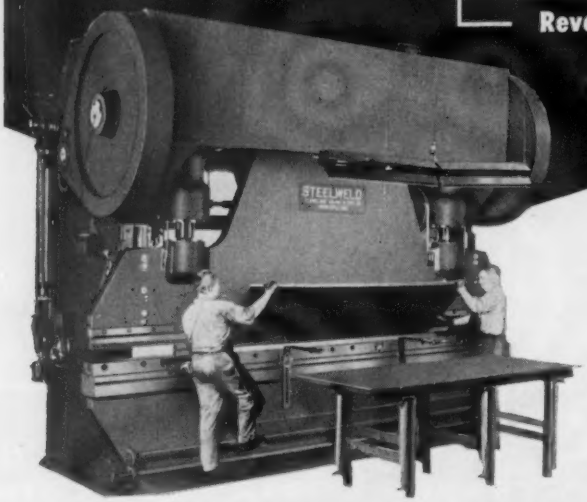


**90° COPYMATIC**
. . . traces in both directions: toward head or tail . . . faces exactly square shoulders . . . maximum versatility and tracing capacity!

*more than ever before . . .*
*your* LODGE-*ical choice is* **Lodge & Shipley**

# Reversing Ram Simplifies Press Operation




Model MO 6-12. Handles plate to 16'-6" x 7/16". Other Steelwelds available for working plate to 24 feet and thicknesses to one inch.

With a reversing ram drive you can back the ram or upper die away from the work at any point in the stroke. It is not necessary for the ram to continue through in one direction as when only the normal press drive is provided.

This feature speeds locating the correct ram position to achieve a specified bend or shape. It saves time and spoilage when trying new dies.

Reversing ram machines have two complete drives, including motor, flywheel, clutch and brake. They are controlled by individual foot pedals on two different shafts, located one above the other across the front of the press.

The reversing ram feature is optional and may be provided on any Steelweld Bending Press. It adds greatly to the ease of operation and because of time-savings it enables, rapidly absorbs the extra original cost.

Steelweld Bending Presses are such versatile tools with so many outstanding features that we urge you to learn all about them. As a starter, send for the catalog below.



***GET THIS BOOK!***

**CATALOG No. 2010 gives construction and engineering details. Profusely illustrated.**

**THE CLEVELAND CRANE & ENGINEERING CO.**

*6457 East 281st Street • Wickliffe, Ohio*

**STEELWELD**

**BENDING PRESSES**

BRAKING • FORMING • BLANKING • DRAWING • CORRUGATING • PUNCHING

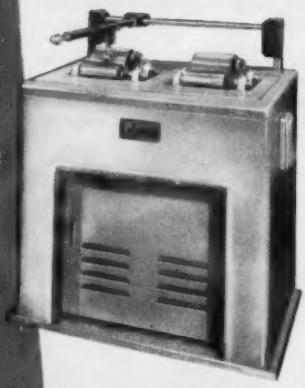
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# New CENTERLESS LAPPER

## by SIZE CONTROL



CUMMINS ENGINE
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**THE NAMES SPOTLIGHTING THIS MACHINE DEMAND THE ULTIMATE IN PRECISION AND QUALITY IN THEIR OWN PRODUCTS.**

*Write or phone today for literature describing what this machine will do for your cylindrically lapped parts.*




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Since 1907

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push button control

## speeds operation and set-up on new Rockford **hydraulic** slotter

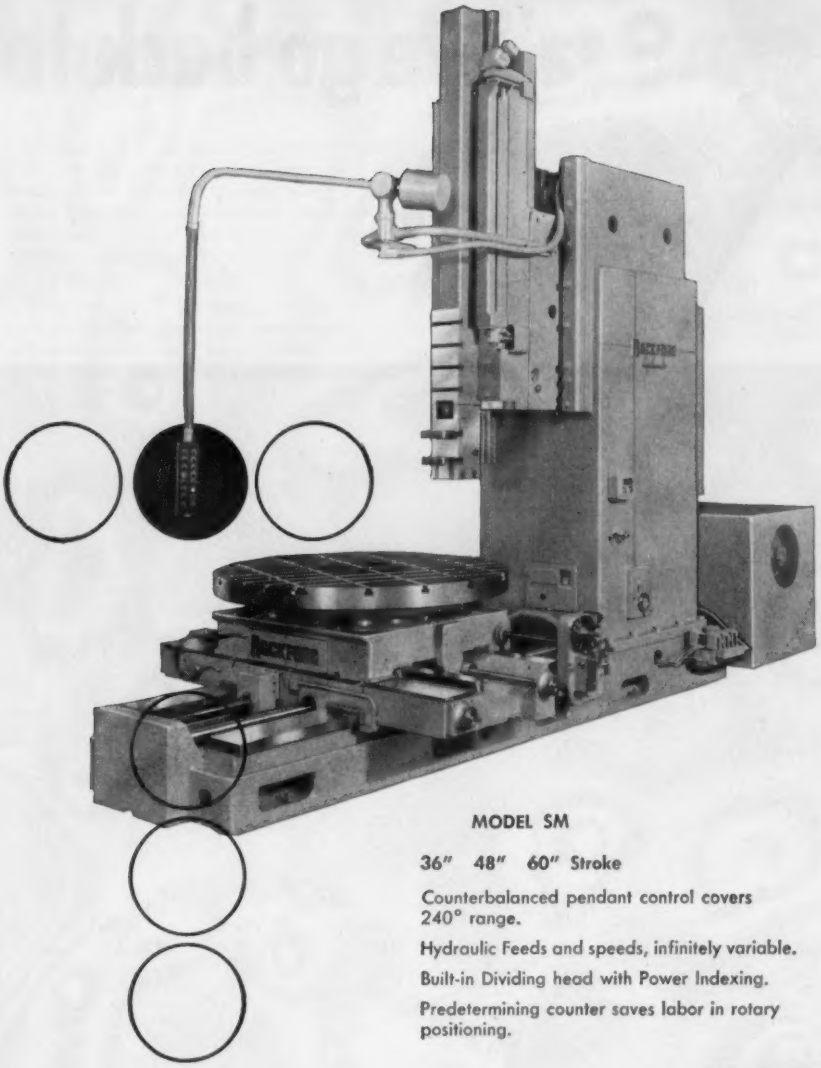
All longitudinal, transverse and rotary movements are selected and operated from the push button station of this new Rockford hydraulic Slotter.

The ram lock is pendant operated and ram stroke length and position are completely push button controlled.

Two-speed table traverse is available, enabling the machine operator to position the work to a few thousandths, without manual movements, although manual control of all movements is available from either side of the machine.

Full hydraulic drive provides two cutting ranges, one for high speeds and low cutting forces; the other for slow speeds and heavy cuts.

Get full details on this new hydraulic slotter from any Rockford Machine Tool Co. representative, or write directly to us.



**MODEL SM**

**36″ 48″ 60″ Stroke**

Counterbalanced pendant control covers 240° range.

Hydraulic Feeds and speeds, infinitely variable.

Built-in Dividing head with Power Indexing.

Predetermining counter saves labor in rotary positioning.

**ROCKFORD MACHINE TOOL CO.**
2500 KISHWAUKEE STREET • ROCKFORD, ILLINOIS

**HYDRAULIC**

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# "we go back to




(Above) Forming highway guard rails from 12 gage steel on Niagara 520 Ton Press Brake.

(Right) Piercing rails with same machine.

(Far Right) Forming chair seat frames for office furniture from 20 gage steel on Niagara 150 Ton Press Brake.

# Niagara for Press Brakes"

"The personnel of our organization has been acquainted with Niagara equipment for years. Niagara will stand behind *any* equipment furnished. Many millions of operations in the past 5 years on their presses and press brakes . . . equipment satisfactory from both the operational and safety standpoint. Our intention is to use the Niagara line entirely."

There in the words of one customer (a large Ohio metal fabricator whose press brake operations are illustrated), you have the sentiments of hundreds. Once experienced with *any* of the other metalworking machines which Niagara makes . . . presses, shears, bending rolls and dozens more . . . one just naturally thinks first of Niagara whenever the subject of press brakes comes up.

REASONS ARE MANIFOLD: (1) Extreme helpfulness of Niagara's engineers in selecting the machine and accessories that will do the job best (no other manufacturer can offer so complete and large a line of sheet and plate metalworking equipment). (2) Unrivaled reputation and experience in the field, dating back 77 years, that assure unquestioned reliability. (3) World-wide recognition for design leadership, combining rock-bottom operating economy and top-notch performance in *every* product it makes (take a moment to run down this partial list of imposing press brake features).

- ***Double end twin drive with double reduction gearing for smooth, uniform application of power at both ends of ram.***
- ***Rugged, all-steel frames with box type crowns of unequaled strength and rigidity.***
- ***Extra heavy, rigid bed and ram for maximum support of dies.***
- ***Gearing totally enclosed in sealed oil baths for thorough, clean lubrication.***
- ***Longer lasting, laminated, nonmetallic ways.***
- ***Powerful, smooth-acting, multiple disc clutch and brake.***
- ***Gibs maintain accurate, endwise alignment of ram.***

Standardized in a complete line, ranging from 50 through 775-ton capacities, Niagara Press Brakes are built to produce a tremendous variety of work uniformly and accurately. Post yourself now on all the details by requesting Bulletin 89 D and, as soon as you can, avail yourself of some really worthwhile suggestions from a Niagara representative. Write.



**NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.**

**DISTRICT OFFICES:**

**Buffalo • Cleveland • Detroit • Indianapolis • New York • Philadelphia**

**Distributors in principal U.S. cities and major foreign countries**

***America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work***

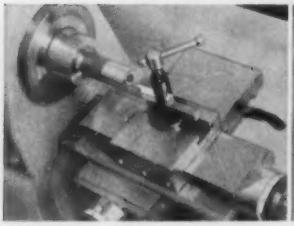


# NIAGARA PRESS BRAKES

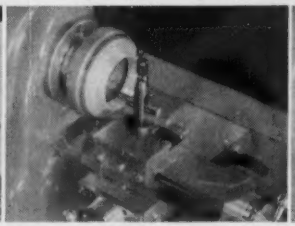
HARDINGE
ELMIRA, N.Y.

# HIGH SPEED PRECISION LATHE

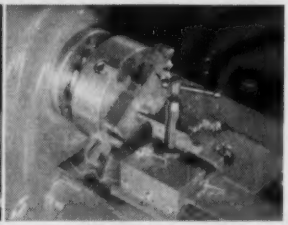
## Correct Size - High Speed - Precision Results



Collet Work — The right machine for collet work of 1-1/16" or less diameter.



Step Chuck Work — For rapid and accurate holding of tubing, castings, moldings, stampings and machined parts. Capacity to 6".



Jaw Chuck Work—Integral mount, universal or independent, for extra accuracy. Capacity to 5".




SPECIFICATIONS:
1¼" Collet Capacity
9" Swing
17" Center Distance
Infinitely Variable Speed
230—3500 r.p.m.

The above three important requirements for proper lathe work in tool rooms, production departments, or laboratories are completely fulfilled by the new Hardinge DV59 High Speed Precision Lathe.

Correct size of the machine in relation to work saves loss from under-capacity production on larger lathes. High spindle speeds, up to 3500 r.p.m., permit full capacity cutting and excellent finish. Sustained accuracy and ease of operation assure precision results.



*Send for Free illustrated Bulletin DV 59*

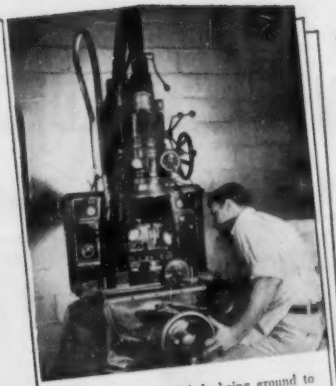
**HARDINGE BROTHERS, INC., ELMIRA, N. Y.**

"PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE"

OFFICES IN PRINCIPAL CITIES. **Export Office: 269 Lafayette Street, New York 12, N .Y.**

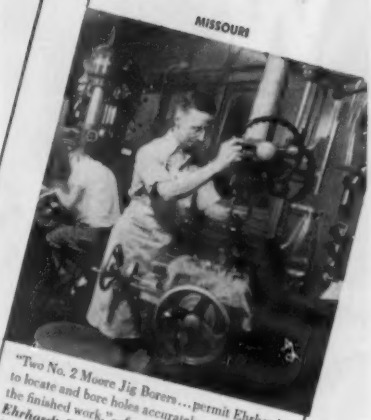
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NEW YORK



"An irregular-shaped hole being ground to within .0002" on the No. 2 Moore Jig Grinder. The machine can do contour grinding of almost any size and shape."—*from facilities booklet of August W. Holmberg & Co., Inc., Flushing, N. Y.*

MISSOURI



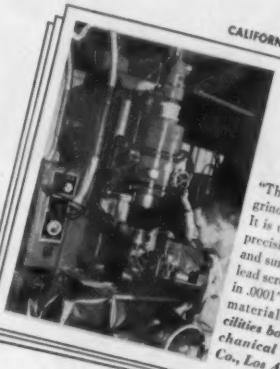
"Two No. 2 Moore Jig Borers ... permit Ehrhardt to locate and bore holes accurately and to inspect the finished work."—*from facilities booklet of Ehrhardt Tool and Machine Co., St. Louis, Missouri.*

# "FACILITIES, FACILITIES, FACILITIES..."

## How Leading Tool and Die Shops Across the Nation Feature MOORE Jig Borers and Jig Grinders

Today, top contract tool and die shops often rely on illustrated booklets to sell prospects on their facilities. And they often rely on pictures of their Moore Jig Borers and Jig Grinders to indicate the degree of precision work they can do. It's particularly significant that leading contract shops choose Moore machines for "double duty"—in the toolroom and on the printed page—for these owner-managed firms are understandably deliberate and judicious in selecting machine tools. Write today for detailed bulletins on Moore's top-billed toolroom teammates.

CALIFORNIA



"This precision jig grinder is a Moore No. 2. It is used for producing precision holes, contours and surfaces to accurate lead screw settings within .0001" in heat-treated materials."—*from facilities booklet of Mechanical Specialties Co., Los Angeles, Cal.*

**MOORE SPECIAL TOOL COMPANY, INC.**
**730 Union Avenue, Bridgeport 7, Conn.**




**HOLES, CONTOURS AND SURFACES**
Moore's *all-new* book tells you how to produce tools, dies and precision parts *the modern way*. 424 pages, 495 illustrations. $5 in U.S.A., $6 elsewhere.

# ADD MOORE TOOLS TO YOUR TOOLROOM

JIG BORERS • JIG GRINDERS • PANTO-CRUSH WHEEL DRESSERS • PRECISION ROTARY TABLES • HOLE LOCATION ACCESSORIES

For more data circle **262** on Reader Service Card

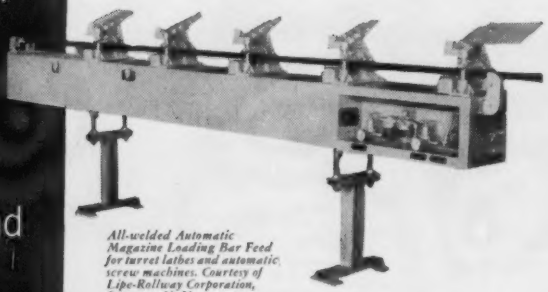
When steel is 3 times stronger than iron . . .

Has two and one-half times the rigidity . . .

Yet costs a third as much per pound . . .

**WHY aren't more of your products designed for welded steel?**

# NOW IT'S WELDED



*All-welded Automatic Magazine Loading Bar Feed for turret lathes and automatic screw machines. Courtesy of Lipe-Rollway Corporation, Syracuse, N. Y.*

## to save cost of manufacture . . . hold closer alignment

HOLDING precision alignment against the whip of bar stock was the problem. Welded steel design was the answer because:

**1. With steel's greater rigidity, an efficient, sturdy yet lightweight bar feed could be designed to withstand the impact of bar stock running at high spindle speeds.**

**2. Fabrication was easier since the design could be built from simple angles, channels, I beams and plate.**

**3. Overall cost was less than using gray iron construction.**

These benefits of welded steel can help you solve many of your design problems today and cut costs besides. Let Lincoln show you how. Write . . .

**THE LINCOLN ELECTRIC COMPANY**

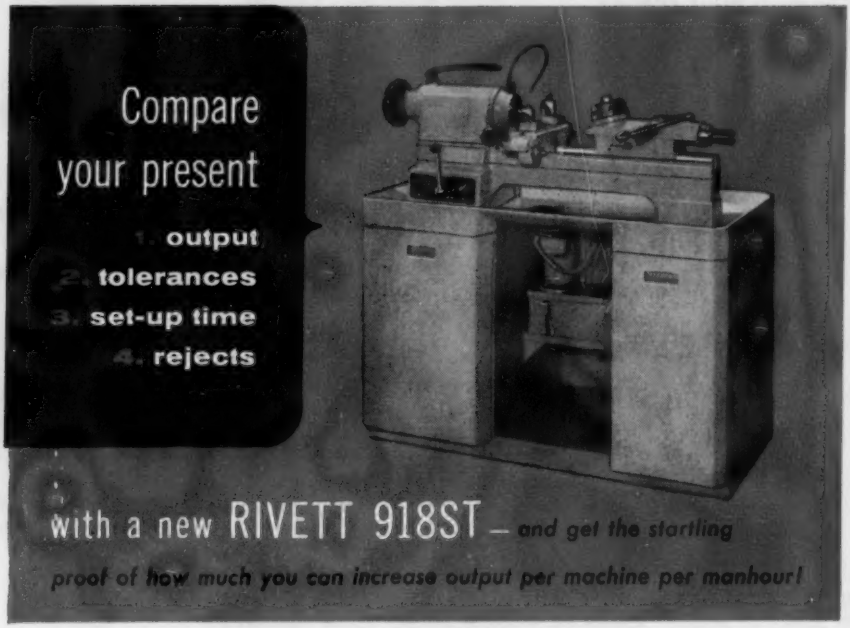
Dept. 3510 Cleveland 17, Ohio

*Creating Lower Costs For Industry . . .*

*With Welded Design*

For more data circle **263** on Reader Service Card

# a challenge to the rated capacity of your present hand turret lathes!




**Evidence from RIVETT customers shows that—**

1. Instant Start-Stop of Spindle Doubles Output (even on short runs of varied pieces)
2. Tolerances—Measured in "Tenths" (on all types of work)
3. Simplified Tooling Cuts Set-up Time in Half!
4. Rejects—NEXT TO NOTHING

*Rivett Features Less Labor Per Piece* • *Write for Bulletin 918STB and See!*



**RIVETT**

**RIVETT LATHE & GRINDER, INC., Dept. MMR-10, Brighton 35, Boston, Mass.**

For more data circle **264** on Reader Service Card

# Holes JIG GROUND with *Vulcanaire*

Provide yourself with this inexpensive* instrument for use on your present equipment and JIG GRIND with a guarantee.



A five station indexing fixture from Vulcan's Contract Tool Room (Your tool room in Dayton).

**YOUR TOOL ROOM IN DAYTON 45th YEAR**

Using a jig borer index table with the Vulcanaire 5 indexing holes and 35 locating and clamping holes were JIG GROUND in place. Result — eliminated all close locating and dowelling of individual parts and of course hours of time.

*Vulcanaire equipment pays for itself on the first job.

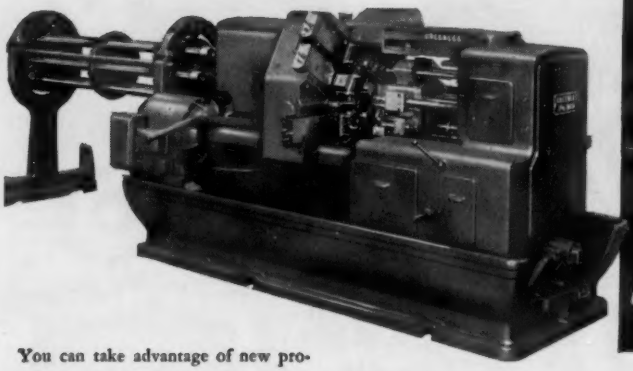
**Borrow Vulcan's instructive movie on jig grinding**

## Services of YOUR TOOL ROOM in Dayton

Engineering, Processing, Designing . . . Special Tools . . . Dies . . . Special Machines . . . Vulcamatic Transfer Machines . . . Automation . . . including the Vulcan Hydraulics that Form, Pierce, Assemble and Size . . . Vulcanaire Grinding Heads . . . Motorized Rotary Tables . . . Plastic Tooling . . . Vulcanaire Jig Grinders.

**VULCAN TOOL CO. • 710 LORAIN AVE. • DAYTON 10, OHIO**

# now... greater accuracy, faster production



**WITH GREENLEE SIX-SPINDLE AUTOMATICS**

You can take advantage of new production techniques...attain higher levels of efficiency with the improved Greenlee 6-Spindle Bar Automatic. Its advanced design opens the door to some real profit opportunities. • These design improvements are fully described in a catalog recently issued. Let us send you a copy today. Find out how Greenlee Automatics can save time and money in your plant. It will pay you to investigate.

### IMPROVED SPINDLE CONSTRUCTION

The spindle has been completely redesigned to assure greater accuracy at higher speeds. True running... the new Greenlee spindle has five widely spaced, preloaded, angular-contact, precision ball bearings. Entire spindle is dynamically balanced for smooth operation. Metallic seals, labyrinth and friction washers with line contact provide maximum heat dissipation.

### INCREASED SPEED

Spindle speed range has been increased. Enables you to take full advantage of the top efficiency and peak performance which carbide and high-speed tooling offer. Reduces down-time losses and tool costs.




**WRITE FOR CATALOG No. A405**

GREENLEE

**GREENLEE BROS. & CO.**
**1890 Mason Avenue**
**Rockford, Illinois**

For more data circle **266** on Reader Service Card

## Every day... *Everywhere*... Your Competitors are using

DEVLIEG
*Spiramatic*
# JIGMILS®



*for*
**ULTRA-PRECISION BORING and MILLING**

### *THE "ACCEPTED" MACHINE FOR JIGLESS PRODUCTION OR ONE-PIECE JOBS*

The DeVlieg System of "JIGLESS BORING"— ★ Eliminates expensive jigs ★ Permits complete flexibility of product design ★ Insures interchangeable assembly of parts without hand fitting.

DeVlieg JIGMILS are widely used in toolrooms and experimental shops for machining all types of jigs, fixtures and experimental parts to precise limits of accuracy with a minimum of operator skill.

*Come to Detroit*
SEE A PRACTICAL
DEMONSTRATION OF THE
JIGMIL TECHNIQUE

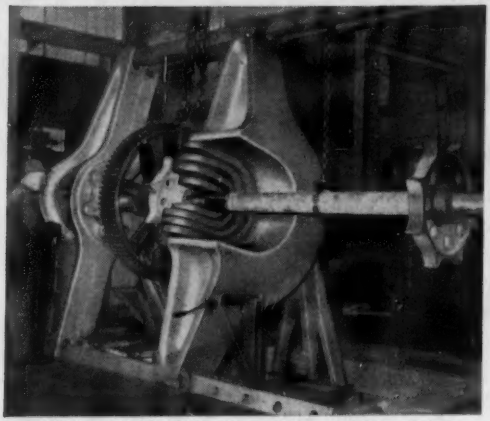
**DEVLIEG MACHINE COMPANY**
*Write for Illustrated Catalog*

450 Fair Avenue • Ferndale
DETROIT 20, MICHIGAN

For more data circle **267** on Reader Service Card

# A MOUNTAIN *of* POWER

## —or a touch of pressure



**POWER FOR BIG JOBS**—Here a Rodgers 600-Ton Inclined Forcing Press is forcing a large gear and sprocket from a mine machine shaft.

The heavy machines and equipment used in the great iron mining industry present a variety of problems when repair or maintenance is necessary. For this work the accurately controlled action of Rodgers Hydraulic Forcing Presses is a real time and work saver.

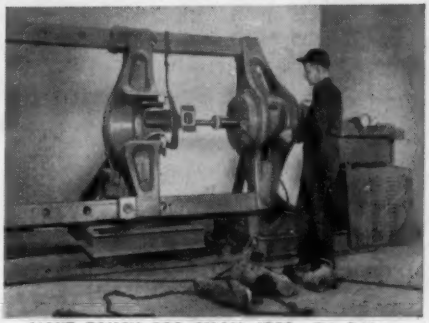
A Rodgers Forcing Press puts a mountain of power at your fingertips to force wheels, sprockets or gears from their shafts and for straightening, assembling, swedging or upsetting jobs. Operators also use the versatility, speed, power and positive control of a Rodgers Forcing Press to efficiently perform small pressing and forcing jobs with just a touch of pressure—tasks once done only on vertical shop presses!

## *you get both with* RODGERS FORCING PRESSES

Rodgers vertical, horizontal and inclined forcing presses offer capacities from 100 to 600 tons . . . up to 9 feet between tension bars . . . up to 16 feet between ram and abutment . . . single or double acting cylinders with 13 or 26-inch ram travel (72-inch travel available) . . . electrically powered hydraulic pumps with selective, positive pressure adjustment and remote control . . . removable press cylinders that can be used in special jacking or pulling jobs . . . and many more features that assure you of dependable, long life operation — all fully described in Rodgers Catalog Number 315A.

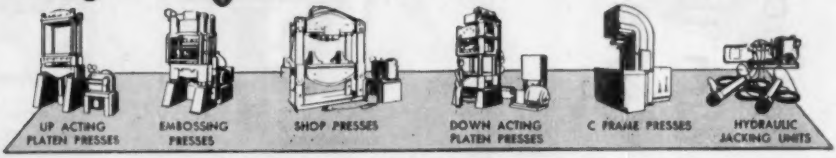



***Write for it today!***



**LIGHT TOUCH FOR SMALL JOBS**—This Rodgers 300-Ton Inclined Forcing Press is used on small as well as large equipment repairs. Here, a pin is being pressed out of a tractor idler support bracket.

## Rodgers Hydraulic Inc. 7447 Walker St., Minneapolis 26, Minn.



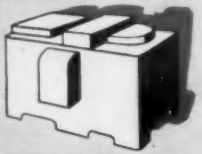

For more data circle **272** on Reader Service Card

If it has anything to do with the application of Heat to Industry . . . . . **BETTER TALK IT OVER WITH *LINDBERG***





Induction Heating Units

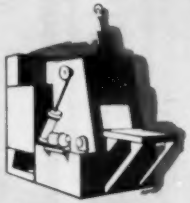


When you're at the Metal Show in Cleveland, please make it a point to visit headquarters for "Heat For Industry", the Lindberg exhibit in Booth 431.

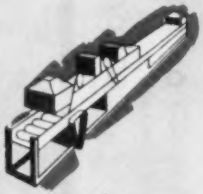
The safest way to be sure that you have the right answer for any application of heat to industry is to talk it over with the most widely experienced experts you can find. We believe we have them here at Lindberg. Our business is concerned only with the development of industrial heating equipment and we manufacture the most complete line in the field; heat treating furnaces, melting furnaces, high-frequency induction units, ceramic kilns; big ones,



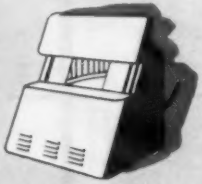
Ceramic Kilns



Carbonitriding Furnaces

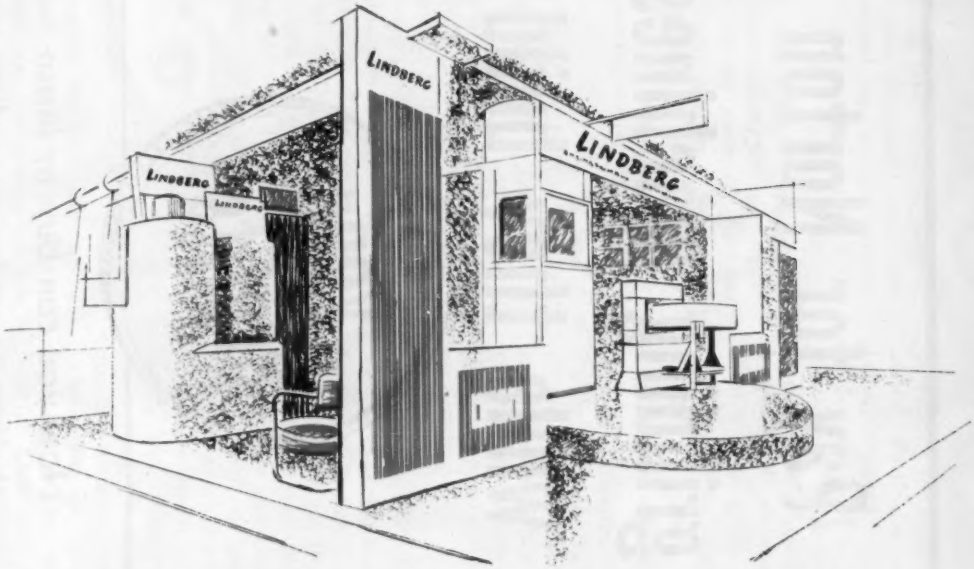


Field-Erected Furnaces



Laboratory Furnaces

Before you decide on any application of heat to industry, it's reassuring to know you have the right answer. Talk it over with Lindberg.




**LINDBERG ENGINEERING COMPANY**

**2469 West Hubbard Street, Chicago 12, Illinois**

**Los Angeles Plant: 11937 S. Regentview Ave., at Downey, Calif.**

For more data circle **274** on Reader Service Card

# Pay for Norton grinding machines while they build




*Now you can buy or lease*
*the most modern grinding*
*or lapping equipment*
*on convenient,*
*economical terms*

By replacing your obsolete grinding and/or lapping equipment with new Norton machines you can meet competition with the best production tools in the field.

***You can now gain this competitive strength without risking financial weakness. Two Norton methods offer you logical, economical ways to modernize without jeopardizing your capital position — and without the need of borrowing or of raising money by any other means.***

### THE NORTON PURCHASE FINANCING PLAN

This Time Payment Plan enables purchase of new machines on extended terms. Simplicity is the keynote. Upon a down payment of 25% of the original purchase price, terms may be extended up to a maximum of five years, at an interest charge of 3¼% per year. Payments are equal and quarterly, starting 60 days after delivery. In the event that you wish to pay off the entire balance at any time, a discount approximately equal to the unearned interest will be allowed.

### THE NORTON LEASE PROGRAM

This Program includes three tested plans for leasing new Norton grinding or lapping machines. Each plan offers you the option of terminating the lease or purchasing the equipment after a stated period. Particular advantages of the Lease Program are: (1) You can acquire needed machines for just the period in which you can use them profitably, thus eliminating the obsolescence factor; (2) You can make a thorough trial of equipment without going to the expense of actual purchase, unless you decide to do so later.

### *A Wide Choice of Machines*

Norton machines available under the Purchase Financing Plan and Lease Program include a broad selection of the most popular types of grinders and lappers. Special arrangements will be considered whenever other Norton machines are required.

### *For Further Information*

see your Norton Representative. He will be glad to discuss the relative merits of each Norton financing method, with regard to your particular requirements. He will also give you complete details of the various machines available and advise you as to which are best suited to your production needs. Or you can write direct. And remember: only Norton offers you such long experience in both grinding machines and grinding wheels to bring you the "Touch of Gold" that helps you produce more at lower cost. NORTON COMPANY, Machine Division, Worcester 6, Mass.


*To Economize, Modernize with* **NEW**

**NORTON**

**GRINDERS *and* LAPPERS**

*Making better products...*
*to make your products better*

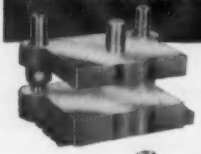
NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories
BEHR-MANNING PRODUCTS: Coated Abrasives Sharpening Stones • Behr-cat Tapes

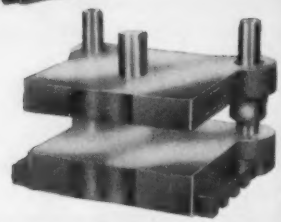
*District Offices:* Worcester • Hartford • Cleveland • Chicago • Detroit

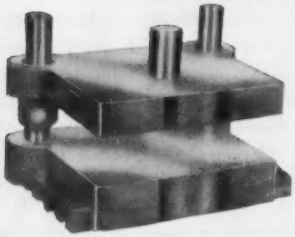
For more data circle **276** on Reader Service Card

A Limitless Range of Die Set Sizes Jig-Bored to *YOUR* Specifications

# SUPERIOR HAS THEM ALL







## No Premium Price

No limitations to so-called "standard sizes" — result no waste — when you use Superior Die Sets. Superior sets are all *individually jig-bored to your specifications:* Result — the number of sizes you can get is almost limitless — you save on excess steel, needless machining, unnecessary weight and handling. Best of all, Superior Die Sets are priced competitively in all given sizes, so you save money in original cost by ordering only the exact size you need.

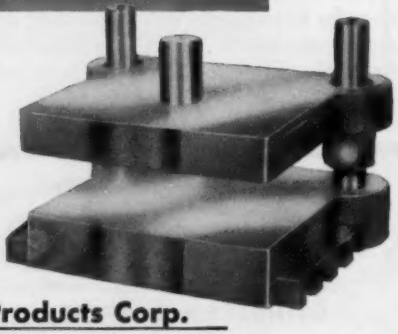
Check the many other exclusive features of Superior Die Sets and you'll see why they lead the field. Write for catalog and full information.

**for fast local service call these Expert Superior representatives**

- Kalamazoo, Mich., Phone 5-7988
- Indianapolis, Ind. BRoadway 5668
- Chicago, Ill., RAndolph 6-8871
- Dallas, Tex., Riverside 5138
- Rockford, Ill., Phone 3-3932
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- Milwaukee, Mitchell 5-6027
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SUPERIOR **Steel Products Corp.**

2754 So. 19th Street, Milwaukee, Wis.

For more data circle **277** on Reader Service Card

How Bullard with two

Man-au-trol turret heads are gang-planed

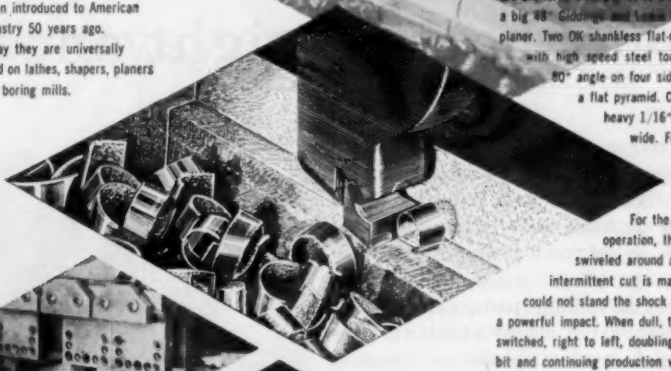
# OK single point tools

The makers of OK single point tools originated the world's first system of inserted tool bits, preground, ready to use.



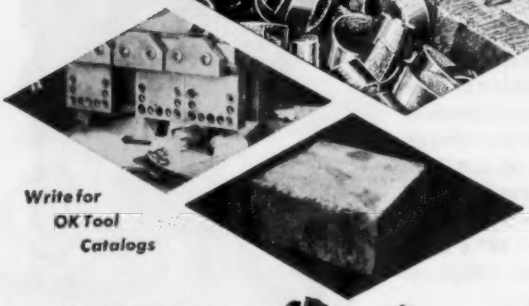
OK single point tools with their interchangeable tool bits were revolutionary when introduced to American industry 50 years ago. Today they are universally used on lathes, shapers, planers and boring mills.

Nine forged billets of SAE 1045 carbon steel, size 20 x 20 x 12" and weighing 1000 lb are anchored with a pilot to the bed of a big 48" Giddings and Lewis 60 hp Hypro planer. Two OK shankless flat-nose tools with high speed steel tool bits cut an 80° angle on four sides, making a flat pyramid. Chips are heavy 1/16" depth, 3/4" wide. Feed, 40 ft/m.



For the second operation, the blocks are swiveled around and a rugged intermittent cut is made. Carbide could not stand the shock of such a powerful impact. When dull, tool bits are switched, right to left, doubling to life of the bit and continuing production with the minimum of downtime.

OK tools are built for heavy machining. Holders are tough forgings. For tool bits, you have a choice of high speed steel, cobolt, Vasco Supreme and carbide.



*Write for OK Tool Catalogs*



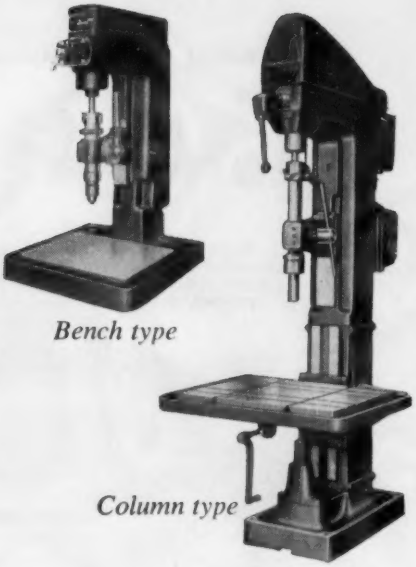
TWO COMPONENTS— BODY AND BLADES

OK

**modern milling cutters for modern milling machines**

**THE OK TOOL CO., INC., Milford, New Hampshire**

For more data circle **278** on Reader Service Card



*Bench type*

*Column type*

The many features of our standard drilling and tapping machines can be combined in more than 100,000 different ways—and one of those combinations exactly meets your requirements.

Capacities in cast iron from very small numbered drills to 2″; No. 32 Jacobs chuck to No. 4 Morse taper.

Six or 8 speeds up to 12,000 rpm; 4 feeds.

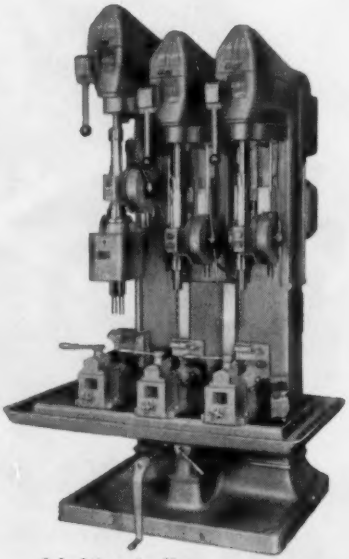
# Avey has the right one

Column or bench type, with wide range of swing, 1 to 8 spindles.

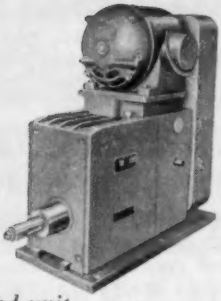
All of our standard drilling and tapping machines include such bonus features as micrometer stop collar, telescoping spindle guard, dynamically-balanced rotating parts, rack-and-pinion-operated motor plate, and our rugged, involute spindle construction.

Tool and die shops like the versatility, accuracy, and speed of our Tool Room machines. They're available with No. 2, 3, or 4 Morse taper. You select the table you need: large (34″ x 25″), round (18″ diameter), or compound (25″ x 12″).

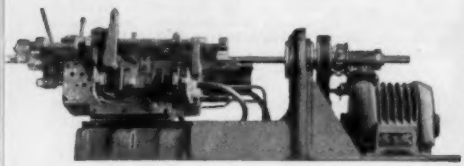
Ask for our literature; or, better yet, ask our representative to help you select the pay-off combination.



*Multi-spindle*



*Cam feed unit*



*Avey-draulic*

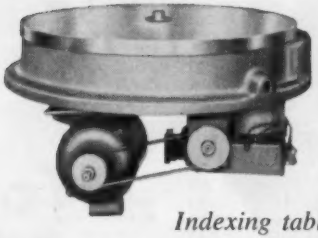
Avey

**drilling, tapping, production machines**

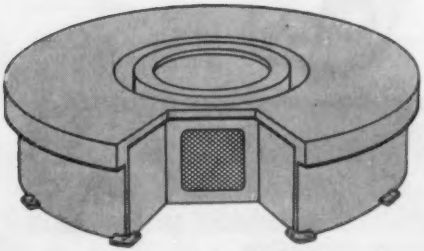
Sharp reductions in unit costs, floor space, machine-handling time, and operating time often make our high-production machines smart investments with fast pay-off periods. They have repeatedly proved this in some of the finest automatic lines in the country.

Our standard units can be combined for either rotary or linear operations. They can be economically re-engineered for successive jobs.

# for Avey makes them all



*Indexing table*



*Standard base*

Automatic cam feed units, for drilling, tapping, reaming, hollow milling. Vee belt or gear drive. No. 1, 2, or 3 Morse taper. Mount at any angle. Fully or semi-automatic. Tamper-proof.

Avey-draulic feed unit. Automatic withdrawal for chip removal only when necessary during deep hole drilling. Rapid advance, feed, and rapid return. Standard strokes 12″ up to 30.″

Automatic index tables. Rapid, accurate indexing to .001″, 3 to 100 stations. Even or uneven index patterns. 16″ to 48″ diameter.

Steel bases. Stress relieved, sandblasted, machined, and painted to fit your application.

Send us a print of your part, and ask for a profit prediction.

THE AVEY DRILLING MACHINE COMPANY
CINCINNATI 1, OHIO

# TEMPER, TEMPER!



If grinding wheel problems have you fighting mad, why horse around? Switch to CINCINNATI (PD)° WHEELS. For *now* CINCINNATI Grinding Wheels offer POSITIVE DUPLICATION—a remarkable achievement that *can save you money . . . and increase your production.*

Through the CINCINNATI (PD) Manufacturing Process you are assured Positive Duplication of the original wheel *every* time you reorder. *Yet* CINCINNATI (PD) WHEELS *are priced no higher than ordinary wheels.*

So, contact your CINCINNATI Grinding Wheels distributor. Or, contact us direct. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

Remember—*only* CINCINNATI Grinding Wheels give you . . . (PD) POSITIVE DUPLICATION.

CINCINNATI° *Grinding Wheels*

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

°Trade Mark Reg. U. S. Pat. Off.

For more data circle **281** on Reader Service Card

# ATTACHMENTS for *Bridgeport*

## TURRET MILLING MACHINES *add outstanding versatility to a machine already versatile*



When you buy the BRIDGEPORT TURRET MILLING MACHINE, you buy more than a conventional vertical milling machine. You actually buy and get a machine of a type conceived, created and developed by Bridgeport. In addition to the turret principle originated by Bridgeport, attachments have been designed which add a great many features to the machine so that its basic purpose for milling, drilling, boring and shaping has been extended to include also cherrying, right angle milling as well as copying with the Bridgeport Hydraulic True Trace Combination.

One of the outstanding advantages of this machine is that you can buy this basic machine with some or all of these attachments or add them later whenever the need arises for the handling of specific operations.

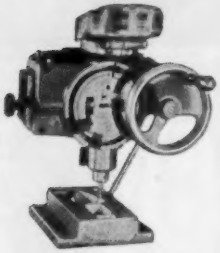
**RIGHT ANGLE ATTACHMENTS**



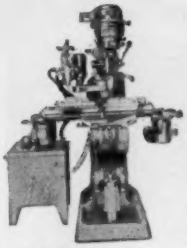
(Above) Heavy Duty . . . for milling and drilling at right angles; fits both Master and 1 HP Bridgeport Heads.



(Above) Light duty . . . for right angle milling and drilling narrow, deep molds and cavities.



**CHERRYING ATTACHMENT**
Makes possible production of convex and concave shapes. Ideal for producing drop forge dies, molds, cavities.



**TRUE TRACE COMBINATION**
The Bridgeport True Trace Combination will give excellent performance and save endless hours when copying irregular dies and molds.

Investigation of Bridgeport Milling Machines and their many attachments is always in order.

**No. 2 BORING HEAD**
Boring Tools and Holder provide means for boring holes up to 6" diameter; available for use on Bridgeport 1 HP Milling, Drilling and Boring Attachment.



*Bridgeport* **MACHINES, INC.**
Bridgeport, Connecticut
*Manufacturers of High Speed Milling Attachments and Turret Milling Machines*

For more data circle **282** on Reader Service Card



Pigsecki Helicopter

# Sun's Heavy Duty Emulsifying Cutting Oil excels on high-alloy aircraft steels

S.E.C.O. Heavy Duty handles all machining jobs requiring an emulsifying cutting oil. Piasecki Helicopter's large job shop at Morton, Pa., found this out three years ago when S.E.C.O. HD* replaced two expensive heavy-duty soluble oils in machining fan hubs.

Extremely versatile and moderately priced, S.E.C.O. HD has been doing an exceptional job in cutting a variety of high-alloy aircraft steels for Piasecki.

For more information about S.E.C.O. HD, see your Sun representative. Or write to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. MM-10.

**WRITE FOR FREE TECHNICAL INFORMATION**

- *Cutting and Grinding Facts*
- *Disposal of Waste Emulsions*
- *New Improved S.E.C.O.*
- *S.E.C.O.—Mixing Instructions*
- *S.E.C.O. HD*

SUNOCO®

*TRADE-MARK

**INDUSTRIAL PRODUCTS DEPARTMENT**

# SUN OIL COMPANY

**Philadelphia 3, Pa.**

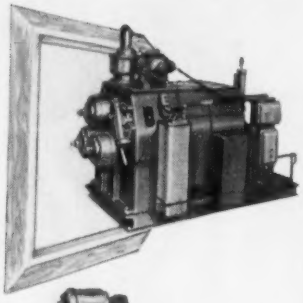
© SUN OIL CO.

**IN CANADA: SUN OIL COMPANY LIMITED, TORONTO AND MONTREAL**

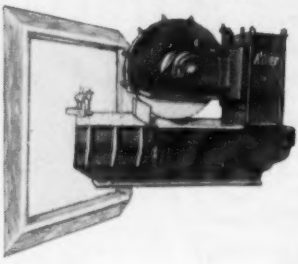
For more data circle **284** on Reader Service Card

# For Data On These And Other
# COST CUTTING
## Kling Metal Working Machines
# WRITE FOR BULLETIN 100

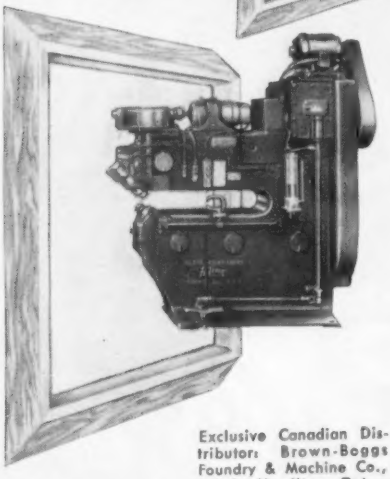
BENDING ROLLS
Angle (illustrated)
and Plate



High Speed
FRICTION SAWS



SHEARS:
Rotary (illust.),
Double Angle
and Guillotine



Exclusive Canadian Distributor: Brown-Boggs Foundry & Machine Co., Ltd., Hamilton, Ont.

In "the best of companies" Kling Machines are increasingly installed for their labor-saving, improved production and savings. For illustrated descriptions and data representing over 50 Kling Machines, write for your Free Copy of new Complete Line Bulletin 100.

1073MMR

Since 1892

Kling

**KLING BROS. ENGINEERING WORKS**
**1320 North Kostner Avenue, Chicago 51, Ill.**

Export Distributor: Simmons Machine Tool Corporation
50 E. 42nd St., New York 17, N. Y.

Makers of Friction Saws; Shears; Punches; Combination Shear, Punch and Coper; Angle and Plate Bending Rolls; Power Bar Benders; Bulldozers.

For more data circle **285** on Reader Service Card



# Why CIMCOOL leads the parade...

There are 3 booming reasons why CIMCOOL° is way out in front—actually the largest selling chemical cutting fluid in the world. And each deserves a rousing cheer as they pass in review:

1. **CIMCOOL LOWERS COSTS** because it's longer lasting in machines. Thus, it reduces down-time and cuts labor costs for cleaning and changing.
2. **CIMCOOL DOES A BETTER JOB** because of its chemical lubricity. It permits faster speeds and feeds, for it combines friction reduction and cooling capacity in a degree never before attained by old-fashioned coolants.
3. **CIMCOOL IS CLEAN,** doesn't soil hands or clothing. It contains no skin irritants. It leaves no slippery film on shoes, floors, machine or work. It can't smoke, can't burn, and virtually eliminates rancidity and foul odors.

For complete details on all the advantages of CIMCOOL Concentrate, consult your CIMCOOL distributor. Or contact us direct and we'll send one of our Cincinnati Milling-trained machinists to call on you—without cost or obligation. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

°Trade Mark Reg. U.S. Pat. Off.

## CIMCOOL CUTTING FLUIDS

CIMCOOL **Concentrate**—The famous pink fluid which still covers 85% of all metal cutting jobs. Effective, economical and clean.

CIMCOOL **Tapping Compound**—Permits the use of highest tapping speeds and increases tap life amazingly.

CIMPLUS—The transparent grinding fluid with exceptional rust control. Also used for machining cast iron and as a water conditioner with CIMCOOL Concentrate.

CIMCUT **Base Additive**—For jobs requiring an oil-base cutting fluid. Added to mineral oils, it gives an economical mix for higher speeds and feeds.

CIMCOOL **Bactericide**—The most effective agent yet developed to overcome rancidity and foul odors.

CIMCOOL **Machine Cleaner**—The two-phase non-corrosive cleaner that removes grit, dirt, slime and oil.

# CIMCOOL Cutting Fluids

*for* 100% *of all metal cutting jobs*

PRODUCTION-PROVED PRODUCTS OF THE CINCINNATI MILLING MACHINE CO.

*Made with MAGNESIUM*

DOW





**A FEW POUNDS make a big difference when jigs have to be moved manually several times an hour.**

# MAGNESIUM FOR LOW-COST TOOLING

## Lightweight magnesium tooling plate costs less to buy, less to fabricate and less to use

• **COSTS LESS TO BUY**—Magnesium tooling plate costs less than commonly used lightweight tooling materials.

• **COSTS LESS TO FABRICATE**—Magnesium jigs and fixtures are easy and economical to build, too. The reason is that magesium tooling plate is easy to machine, easy to weld.

• **COSTS LESS TO USE**—Magnesium weighs one fourth as much as steel and only two thirds the weight of aluminum. By making your jigs and fixtures with lightweight magnesium you'll increase worker efficiency and reduce lost-time injuries.

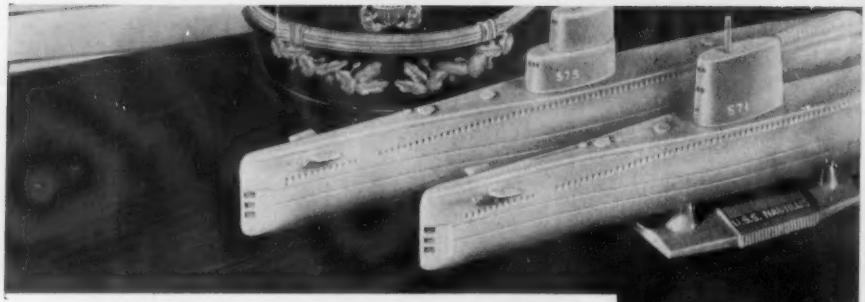
For more information about magnesium tooling plate contact your nearest supplier of Dow magnesium, or write THE DOW CHEMICAL COMPANY, Midland, Michigan, Dept. MA 397M.

*Available from stock at:* **Copper and Brass Sales, Inc., Detroit, Mich. • Fullerton Steel and Wire Company, Chicago, Ill. • Hubbell Metals Inc., St. Louis, Mo. • A. R. Purdy Co., Inc., Lyndhurst, N. J. Reliance Magnesium Company, Los Angeles, Calif. • Vinson Steel and Aluminum Co., Dallas, Texas.**

*you can depend on DOW MAGNESIUM*

DOW

For more data circle **288** on Reader Service Card



## REPEAT PERFORMANCE



*First the Nautilus . . . and now the Seawolf is equipped with*

**PRATT & WHITNEY**

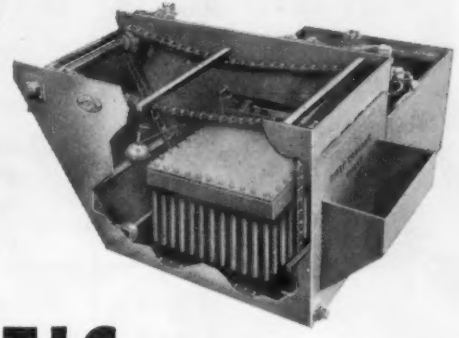
# KELLERFLEX CARBIDE BURS

Star performers in any field rate encores. That's why Pratt & Whitney Kellerflex Carbide Burs . . . used throughout construction of the world's first nuclear-propelled submarine, U. S. S. Nautilus, and included in her tool kit . . . are now repeating their performance on the Seawolf.
That's typical of Kellerflex Burs, because Pratt & Whitney's master machine grinding process guarantees exact uniformity . . . bur to bur. And it takes uniformity to insure consistent, Repeat Performance.
So for Defense or Industrial usage, choose Kellerflex Burs . . . consistent performers anywhere. For complete information, write for Circular No. 564.

**PRATT & WHITNEY COMPANY**
INCORPORATED
25 Charter Oak Boulevard, West Hartford 1, Connecticut
*Branch Offices and Stocks in Principal Cities*
**MACHINE TOOLS • GAGES • CUTTING TOOLS**
For more data circle 289 on Reader Service Card

# TOPS IN AUTOMATIC FILTERS

. . . in minimum space requirements
. . . in maximum flow capacities
. . . in versatility of application



THE

**Delpark**

# FILTER-MATIC

## TUBULAR SCREEN TYPE FILTER
## 5 TO 1000 G.P.M. FLOW CAPACITIES

Tubular screens of small diameter manifolded together into a common suction header form the high capacity filtering elements for the new Delpark Filter-Matic.

The tubular screens, through which the liquid is drawn, are cleaned by an automatically controlled reverse flow through the screens. Sludge removed drops to the bottom of the tank and is carried out by continuously operated chain driven flights. Filtered liquid is supplied from a reservoir and the supply is not interrupted during cleaning.

Delpark Filter-Matics may be used with precoat for which an automatic precoat feeding device is supplied.

Write for more detailed information on this newest development in filtration for industry.

**Delpark**

*. . . FIRST in Filtration Advancements*

**INDUSTRIAL FILTRATION COMPANY**
**13 INDUSTRIAL AVENUE**
**LEBANON, INDIANA**

For more data circle **290** on Reader Service Card

*Bob Rossi, Chief Engineer, tells*
*Roy Johnson, Plant Manager*





# "We switched to Formbrite —and saved 12 cents apiece!"





.032" gage 70-30 Formbrite is used for this 4½" diameter rearview mirror head shown full size. Strip is 5 13/32" wide supplied in heavy coils for long press runs. Copper, nickel and chromium plating on a solid brass base provides a bright, rustless, long-lasting outdoor finish.



Peerless Rearview Mirrors. "Flight-Wing," below, and the newer "Director" model, left. Housings and mounts are chromium-plated zinc-base die castings.

This easy-to-polish, superfine-grain drawing brass has been slashing finishing costs in plant after plant, on all kinds of jobs. Now Peerless Accessories Co., of Mount Holly, N. J., reports:

"To our line of lighting and safety automotive accessories, we've recently added two rearview mirror assemblies. We had been using regular drawing brass for the dished head until your representative persuaded us to try Formbrite. Here are the results, based on a very careful cost study:

| Finishing procedure using regular drawing brass | Present procedure using Formbrite* |
|---|---|
| 1) Grease grinding or "cutting" | Not necessary with Formbrite |
| 2) Buffing | Light buff |
| 3) Copper strike | Copper strike |
| 4) Nickel plate (.00045") | Bright nickel plate (.0003")* |
| 5) Buffing nickel | Not necessary |
| 6) Chromium plate | Chromium plate |
| **Cost 27¢ each** | **Cost 15¢ each** |

*"That's a saving of 12 cents apiece. Multiply it by 3,000 to 4,000 a day and it becomes important money!"*

*Formbrite's superfine grain made possible a lighter but equally serviceable plate of bright nickel

Surprisingly, Formbrite doesn't cost a penny more. Find out for yourself how its superfine grain, excellent drawing properties, strength, and scratch resistance can help you make a better product at lower cost. Write for Publication B-39. Better yet, ask us about a sample lot. The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

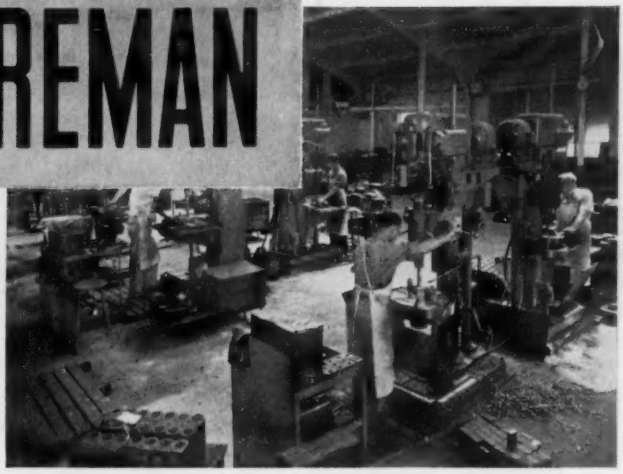
Formbrite FINE-GRAIN DRAWING BRASS

an ANACONDA® product
made by The American Brass Company

# CLEEREMAN

## DRILLING MACHINES

A battery of box column and round column Cleereman Drilling Machines on production work. One of many such installations producing at lower costs with higher production, less operator fatigue and no down time.



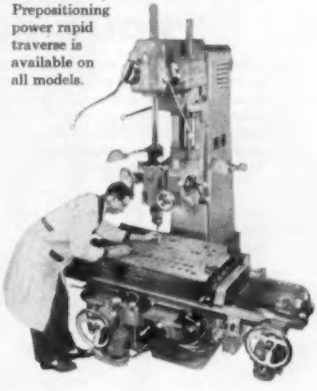


## LAYOUT DRILLING MACHINE

A modern solution to an old problem. Built for those tool room and manufacturing jobs which do not require the ultra precision of Cleereman Jig Borers. The Cleereman Layout Machine is an economical machine capable of locating within .001" per foot and drilling, boring, reaming, tapping, etc., with utmost operator ease at a fast rate of production.

## JIG BORER

Unexcelled precision for ultra-fine tolerances on highest quality gage, tool, die, jig and fixture work and on "jigless" production. Combines stamina with precision and ease of operation. Prepositioning power rapid traverse is available on all models.

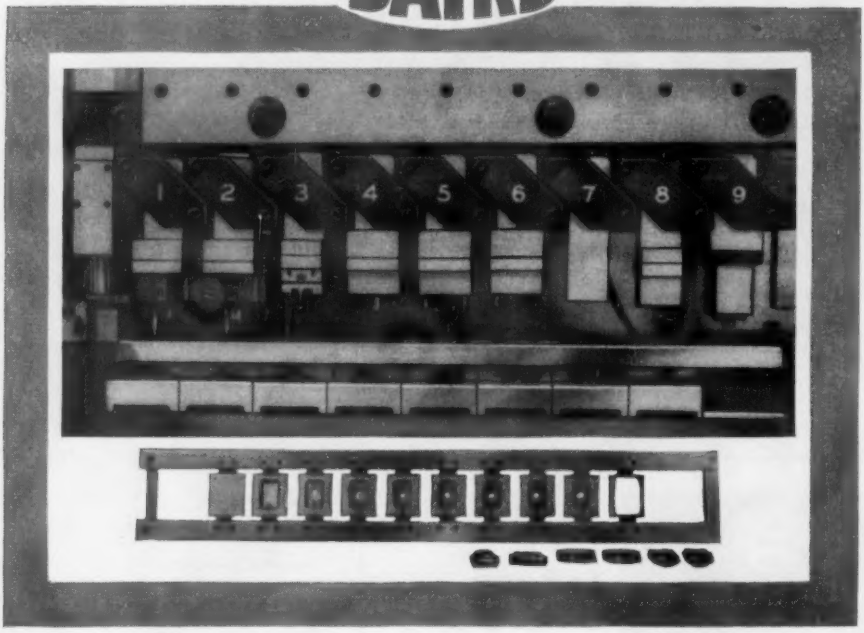


BRYANT
Machinery & Engineering
• Company •
General Office
555 West Washington Blvd., Chicago 6
Representatives in Principal Cities

**CLEEREMAN MACHINE TOOL CORP., Green Bay, Wis.**

For more data circle **292** on Reader Service Card

# ...ask BAIRD about it

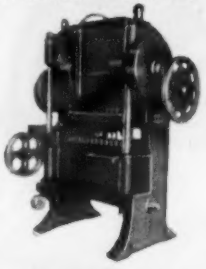



## How to make money on a

## "FOUR-FOOT PRODUCTION LINE"

This typical tooling on a Baird Automatic Multiple Transfer Press is, in effect, a complete production line for oven switch plates and a very profitable one at that. Because not only does this machine produce at the rate of 3,600 pieces per hour day in and day out but, like all Baird Multiple Transfer Presses, tool maintenance is extremely low; tool changes when required are very quickly made with minimum down-time.

You, too, can enjoy this kind of HIGH SPEED, HIGH ACCURACY, LOW COST and SMOOTH RUNNING production by combining operations on Baird Automatic Multiple Transfer Presses. Because of Baird's exclusive design, with such important features as gate dwell and new type of transfer mechanism, MORE operations of MORE different types are now possible in a single tooling. It always pays to "ask Baird about it" before you tool. Write Dept MM.



Industry's lowest cost press production methods

*Interested in Deferred Payment? . . . "ask Baird about it."*

THE BAIRD MACHINE COMPANY
STRATFORD CONNECTICUT

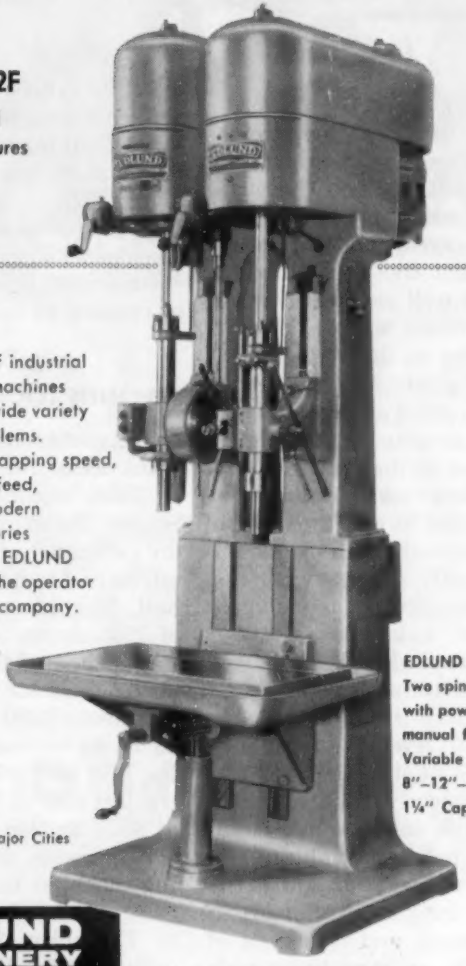
For more data circle **293** on Reader Service Card

# EDLUND

# AMERICA'S MOST VERSATILE DRILLING MACHINE

**EDLUND Model 2F**

**Infinitely Variable Speed**
**Modern Production Features**
**Long Lasting—**
**Rugged Construction**



The changing pattern of industrial production requires machines readily adaptable to a wide variety of production problems. Selection of **any** drilling or tapping speed, manual or power feed, and many other modern production accessories make operation of the EDLUND Model 2F a pleasure for the operator and good sense for the company.

***Write for Bulletin 140R.***

**EDLUND Model 2F**
**Two spindle combination with power feed and manual feed.**
**Variable speeds to 3600 rpm**
**8"–12"–15" Overhang**
**1¼" Capacity**

EDLUND Representatives in Major Cities

**EDLUND MACHINERY COMPANY**
**Cortland, New York**
Division of Harsco Corporation

Write for Bulletin G56 — Complete Line with Cam Feed Units
Bulletin 160 — Model 1F–High Speed
Bulletin 170R— Model 4F–Production

For more data circle **294** on Reader Service Card

# OVER THE EDITOR'S DESK . . .



## OUTLOOK

As we turn into the home stretch of the current year with only three short months left, we find the business analysts busily engaged in gazing into their crystal balls in an attempt to predict the final outcome of the year as well as predict what business conditions will be like far into the months of the year ahead. The work of the business analysts is nice if you can get it especially since no one seems to take the trouble to later hold them to their word. They always somehow manage to leave enough loopholes to slip through to avoid being pinned down.

It seems hardly necessary for the production executive in any metalworking plant today to seek the opinion of anyone else. The momentum of good business alone would be sufficient to carry things along on a continuing high level. We need only refer to the recent steel strike which, although completely shutting steelmaking facilities down for more than a month, did not appreciably affect business as a whole. And now is the time of year for model changes in autos, appliances, and hundreds of other products, an incentive which always seems to provide continuing and often greater production.

While both residential and nonresidential construction are reported to be tapering off, the overall effect will not be great enough to cause alarm. Private and business spending remains at an all time high and gives every indication of continuing.

American industry can find a lot of reasons to be optomistic.

★ ★ ★

## MACHINE TOOLS

Shipments of cutting type machine tools during this second half of 1956, according to the United States Department of Commerce, are estimated at $395 million, an increase of $18.6 million over the first half. Shipments in the second half of 1955 approximated $327 million. It is estimated that second half 1956 new orders for such tools will approximate $480 million, as compared to an estimated $506 million in the first half. New orders placed in the last half of 1955 were estimated at $557 million.

Shipments of forming and shaping machine tools are estimated at $130 million for the period July 1 to December 31, 1956, compared with $131.3 million in the first half of this year. Comparable second half 1955 shipments approximated $104

# I'LL DO THE SET-UP ON THE GRAND RAPIDS GRINDER



Grand Rapids Cutter Grinder
No. 62 Power Feed Model

*The boss knows a soft touch when he sees one.* He's been around the toolroom long enough to know that Grand Rapids Cutter Grinders are famous for unusually fast and convenient set-ups. Like toolroom experts everywhere, he knows, too, that Grand Rapids Cutter Grinders are unmatched for precision sharpening, fast, easy operation and minimum maintenance.

Model 62 has four-speed spindle drive, fully guarded ball bearing ways, more vertical capacity and exceptionally long swing. One-shot lubrication system cuts maintenance time.

Take a tip from the boss . . . choose Grand Rapids Cutter Grinders for fast, easy, *precision* toolroom grinding.

GALLMEYER & LIVINGSTON

**GALLMEYER & LIVINGSTON COMPANY**

**408 Straight Ave., Grand Rapids, Mich.**

***Please send me literature on the complete line of Grand Rapids Cutter Grinders:***

Name _____ Firm _____

Address _____

City _____ State _____



million. New orders for these tools in the second half of 1956 are estimated at $138 million, compared with $148.7 in the first half, and with $225 million in the last half of 1955.

Shipments of resistance welding machines, accessories and electrodes in the second half of 1956 are expected to total about $40 million, in comparison with $43.6 million in the first half, and with about $39.5 million in the second half of 1955. New orders for this industry's products in the second half of 1956 are estimated at $48.8 million as against $66 million in the first half, and with $45.1 million in the last six months of 1955.

★ ★ ★

## EVERYTHING IS SATISFACTUAL

Most of us, I believe, are acutely aware of the frequent criticism that is leveled against claims made in the advertising which appears on TV, radio, in newspapers and consumer magazines. It is rare, however, that we hear any criticism of the advertising that appears in the industrial publications. It is not our intent to question the qualities—sincerity, integrity, and honesty—as they relate to various forms of advertising, but to merely point out that these qualities are much in evidence in industrial advertising.

Of the many reasons for this difference, I think it will be sufficient to name only a few. Generally speaking, the ads in the industrial magazines are factual. In an examination of the copy found in most industrial advertising, you will find claims, but you can feel confident that specifications are accurate, that the performance claims can usually be substantiated, and that the equipment is just as close as possible as to what is advertised.

Writers of copy for industrial ads, for the most part, know their products as intimately as the men who design and build them. It is only natural, therefore, that most industrial advertisements reflect this knowledge and experience. Most industrial ads contain a wealth of technical data . . . practical, helpful information that amply repays the reader for the time taken out of a busy day to read them.

To bring this subject very close to home we might take a close, critical look at the advertisements in this issue of *Modern Machine Shop.*

★ ★ ★

## BUSINESS FAILURES

Dun & Bradstreet recently reported that business failures in the United States averaged close to 1,100 per month during the first half of this year, setting a new post-war high both in the number and in aggregate liabilities. An explanation was given as to why so many failures occurred at a time when gross national output was at a record rate of $408 billion a year.

More than half the failures were businesses of five years old or less. D & B said that 90 per cent of the failures could be attributed to inexperience. About half of those failing in business were retailers.




For more data circle **295** on Reader Service Card

OVER THE EDITOR'S DESK . . .



## HOW MUCH?

Using the current employment figure of roughly 55 million in private nonfinancial business, the average American worker uses assets valued at $12,500. This includes investment in plant and equipment, land and natural resources and working capital — a total of nearly 700 billion dollars. Looked at another way, it takes, on the average, $12,500 to create one job.

★ ★ ★

## METAL SHOW

Highlight of the month will be the gigantic Metal Show in Cleveland, October 8 through 12. This huge Exposition and Congress, being held in the Public Auditorium, will be sponsored by The American Society for Metals, The American Welding Society, the Metals Division of American Institute of Mining, Metallurgical, and Petroleum Engineers, and Society for Non-Destructive Testing.

Those who attend the Exposition and Congress will find great emphasis on cost-cutting economies made possible through the application of new equipment. Visitors to an event such as this always profit from personal contacts, first hand viewing of new tools, equipment and processes, and ideas gleaned from the papers presented in the technical sessions.

Be sure to check the details of the Show beginning on page 132 of this issue of *Modern Machine Shop.*

# *Letters to the Editor:*

### Eye Protection

We have been reading your fine magazine *Modern Machine Shop* for twenty years and enjoy it very much. The past few years, the things that have really bothered me the most are the many ads and pictures showing machinery in operation and the operator standing close by without eye protection.

It is our policy, and I'm sure the policy of many other companies, to send trade and industrial magazines out to the plant for the employees to read or take home. It is also a condition of employment that our people must wear eye protection when working with or around machinery. It seems to me, in the interest of safety, all pictures considered for publication should be carefully screened for the basic safety precautions. This would then be a valuable medium for promotional safety.

Please understand, your magazine is not the only one where safety is ignored in the advertisements. This condition, as near as I can tell, is industry wide. *Modern Machine Shop* is one of my favorite magazines; therefore, I would like to see you spearhead a drive to correct the careless eye protection situation.

*Dale P. Minyard,*
*Plant Superintendent*
*Electric Steel Foundry Company*
*721 Porter Street*
*Danville, Illinois*

● *We recognize the responsibility for promoting eye safety and promise renewed vigilance where we may have been lax in the past. It is hoped*

**NOW... Automatic Positioning,**

**choice of two measuring systems**

**on MOORE-FOSDICK**

**Jig Grinder!**



Exclusive automatic positioning makes the new Moore-Fosdick Jig Grinder an extremely versatile machine! Besides large work capacity (22" x 44" or 18" x 36" x 27" height) you get increased speed and precision. At the touch of a button, table and saddle position automatically to ± .0001"!

A choice of two precision measuring systems is available. With the new and exclusive Direct Dimension Measuring, dimensions from blueprint are simply set on direct-reading drum dials. The other system, Rod and Bar Measuring, employs measuring rods, micrometers, and for high production work, duplicating bars. Either measuring system may be installed with or without automatic positioning, but both systems cannot be installed on the same machine.

On the Moore-Fosdick Jig Grinder you can grind conical holes with taper in either direction, as well as cylindrical holes. An angular and indexing device built into the main spindle, and the recently developed slot grinding attachment, give quick, accurate grinding of any contour — *regular or irregular*. Write for price and delivery information.

Other outstanding features include: infinite range of grinding speeds—12,000 to 60,000 rpm, contour and chop grinding, spindle-housing heat control.

**NEED JIG GRINDING EQUIPMENT? GET A PROPOSAL FROM FOSDICK!**



Fosmatic Radial Drills | Jig Borers | Sensitive and Upright Drills | Sensitive Radial Drills | Jig Grinders | Automatic Positioning Jig Borers

**THE FOSDICK MACHINE TOOL CO., CINCINNATI 23, OHIO**

FOSDICK



*that through publication of this letter many of those responsible for preparation of ads will heed the safety suggestion.—Ed.*

### Tooling Technique

Please send me six reprints of the article "New Tooling Technique for Guided Missile Fabrication" published in the March 1956 issue on Pages 104 through 109.

*L. F. Grossman, Fabrication Specialist*
*Aircraft Gas Turbine Division*
*General Electric Company*
*Cincinnati 15, Ohio*

### Machining Economics

I would appreciate six copies of the article "Machining Economics" which appeared in the May issue of *Modern Machine Shop.*

*James D. Brockson,*
*Factory Superintendent*
*Lanston Monotype Machine Company*
*24th & Locust Streets*
*Philadelphia 3, Pennsylvania*

### Ultrasonic Methods

Will you kindly inform us whether there are any special publications covering the subject of pickling or cleaning of hot rolled steel strip or steel plates, and also dealing with shearing of 2 to 3 in. section steel billets? Perhaps you could also direct us to some manufacturer or firm supplying devices or apparatus using the ultrasonic method for both cleaning or removal of scale from hot rolled steel strip and also for the sectional cutting of steel billets, both of SAE 1010 and 1012 steel.

*A. Alvarez Vazquez*
*Av. de Mayo 560—5°*
*Buenos Aires, Argentina*

● *List of manufacturers sent.—Ed.*

### Epoxy Dies

Please send me two copies of the article "How to Make and Repair Epoxy Dies" which appeared on pages 128 through 132 of the January issue.

*D. R. Fredrick*
*Stratos—Western Branch*
*1800 Rosecrans Avenue*
*Manhattan Beach, California*

### Plant Layout

We would be interested in obtaining reprints of your article "Visualizing Plant Layout in Three Dimensions" which appeared in the June and July issues of *Modern Machine Shop.*

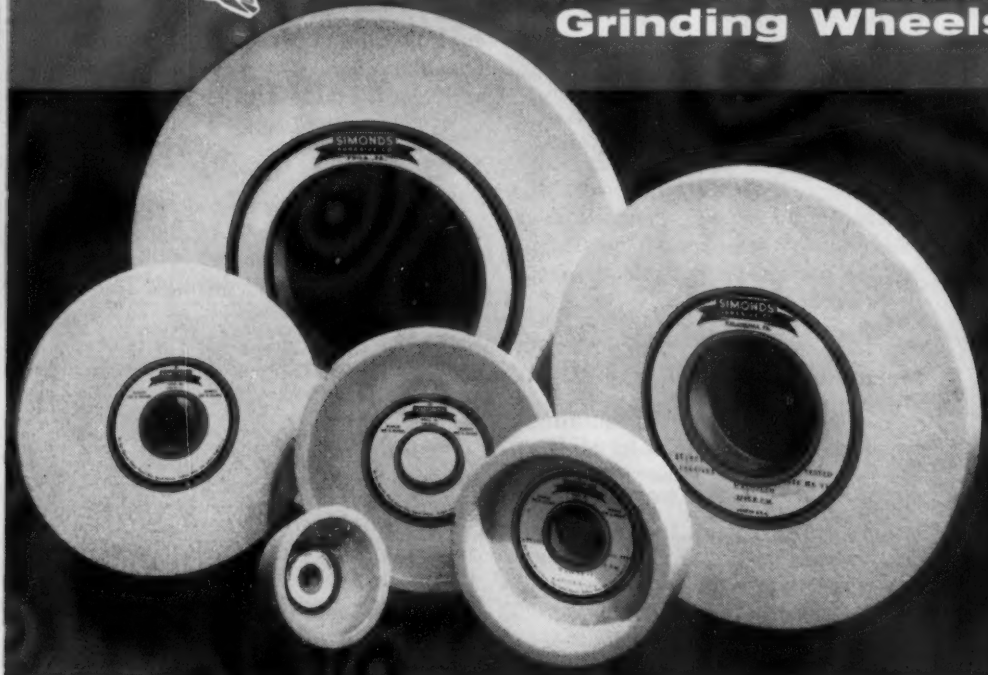
*J. E. Nancarrow, Supervisor Eng. Dept.*
*The Steel Company of Canada, Limited*
*Toronto 3, Canada*

### Square Holes

We are interested in the address of companies that make drills and guides for drilling square holes. The project we have at hand requires the drilling of a diamond shaped hole. We are of the opinion that *Modern Machine Shop* could perhaps supply us with company names. Any

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G. A. Weingartner Co., Inc.
1243 Kenmore Road
Kenmore 17, New York

● *One of the best methods is available from Watts Brothers Tool Works, Wilmerding, Pennsylvania, whose advertisements on the drilling method have appeared in every issue since June, 1936.—Ed.*

### Machinability

We are interested in obtaining two copies of the articles by Howard E. Boyer titled "How to Select Steels for Best Machinability" which appeared in the April and May issues.

L. E. Olson, Assistant Manager
United States Steel Supply
208 South LaSalle St.
Chicago 4, Illinois

● *Copies of articles requested sent.*

### Way Cover

I have been trying to locate a manufacturer of a roller cover with spring windup which can be used to cover the long ways of either a planer or milling machine. The cover itself should be 10 in. wide by 20 ft. long and made of a heavy canvas or plastic material. This type of way cover operates on very much the same takeup principle as the ordinary roller type window shade used in the home.

Charles H. Miller
3815 Webster Street
Oakland, California

● *Covers of the type described have been furnished to several machine tool manufacturers by the Grimm Window Shade Company, 1303 Walnut St., Cincinnati 10, Ohio.—Ed.*

### Laboratory

We would appreciate, if available, reprints or tear sheets of the article "Metrology Laboratory" which appeared on pages 132 through 135 of the April issue.

Sidney Silverman
Dessil Tool and Supply Company
735 Prospect Avenue
Cleveland 15, Ohio

### Standard Costs

We would appreciate receiving three copies of the article "Standard Costs in Accounting for Profits" which appeared in the June issue of *Modern Machine Shop.*

Harry A. Zaruba, Supt. Ind. Eng.
Cleveland Rock Drill Division
Westinghouse Air Brake Company
12500 Berea Road
Cleveland 11, Ohio

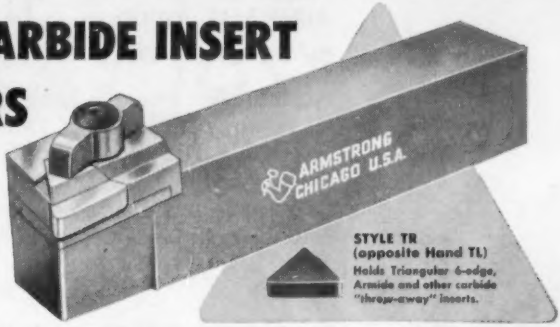
### Bolts and Clamps

I would appreciate receiving a reprint of "Swinging Bolts and Clamps" by Fred Rogers which appeared in your June issue.

Warren E. Collins, Jr.
Warren E. Collins, Inc.
555 Huntington Avenue
Boston 15, Massachusetts

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**STYLE TR**
**(opposite Hand TL)**
Holds Triangular 6-edge, Armide and other carbide "throw-away" inserts.




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Holds square, 8-edge, Armide and other carbide "throw-away" inserts.

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# FEATURES IN




OCTOBER
1956

**PRECISION ROUTING OF ALUMINUM AIRFRAME PARTS**

***By Gilbert C. Close***

An intensive research program, conducted at the El Segundo Division of Douglas Aircraft Company, has resulted in the development of improved routers for hogging and finish-type cuts. This article illustrates and discusses the application of these routers to the production of aluminum airframe parts. Page 104.

**MAGNETIC CHUCK FACILITATES DRILLING OPERATIONS**

Using a novel magnetic chuck, developed by The Dumore Company for its Micro-Drill, holes down to 0.001 inch in diameter can be drilled with drill runout instantly corrected by a simple truing operation. Page 112.

**FORMING AERODYNAMIC STRUCTURES**

***By Ira S. Roberts***

This picture story outlines the various operations performed at Pastushin Aircraft Corporation in fabricating sheet metal airplane parts to rigid specifications. Page 114.

**KEYING BY THE WOODRUFF METHOD**

***By Fred Rogers***

In this first installment of a two-part article, the author, in addition to discussing the advantages of the Woodruff method of keying parts, presents helpful hints regarding the use of Woodruff keys. The second part of this article will be published in the next issue of this magazine. Page 122.

# THIS ISSUE

VOL. 29
No. 5

## 38TH NATIONAL METAL CONGRESS AND EXPOSITION

A concise report is given of the "Metal Show," to be held in Cleveland from October 8th through 12th by the American Society For Metals; American Welding Society; Institute of Metals Division, American Institute of Mining and Metallurgical Engineers; and Society for Non-Destructive Testing. Page 132.

## WHY NOT ENJOY YOUR WORK?

***By Alfred M. Cooper***

In this enlightening article, ten factors are discussed as to why the industrial executive or supervisor may not be getting the fullest enjoyment from his work. Page 138.

## UNUSUAL WELDING APPLICATIONS FEATURED IN AGRICULTURAL EQUIPMENT MANUFACTURE

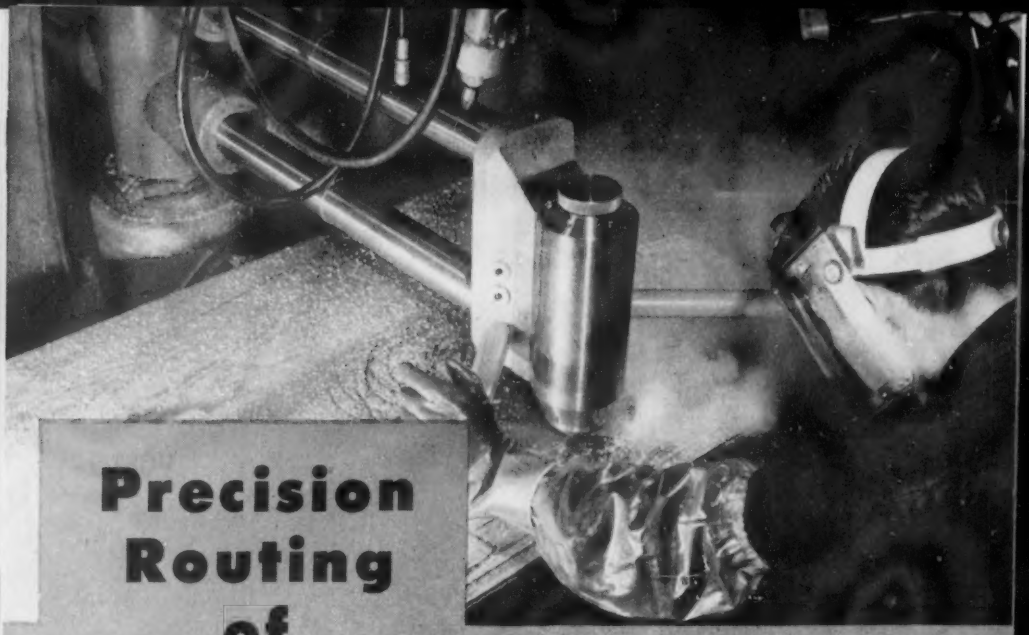
***By C. V. Gorecki***

At the Batavia, New York, plant of Massey-Harris-Ferguson, Inc., large producer of agricultural machines, a carbon arc is used to fuse drawn cups into the ends of tubes used in the manufacture of agricultural equipment. In another setup, plug welds are used to fasten channels to the concave side of a special combine grate. Page 154.

## MODERNIZE YOUR SHOP AND SAVE MONEY

***By Jack Bedford***

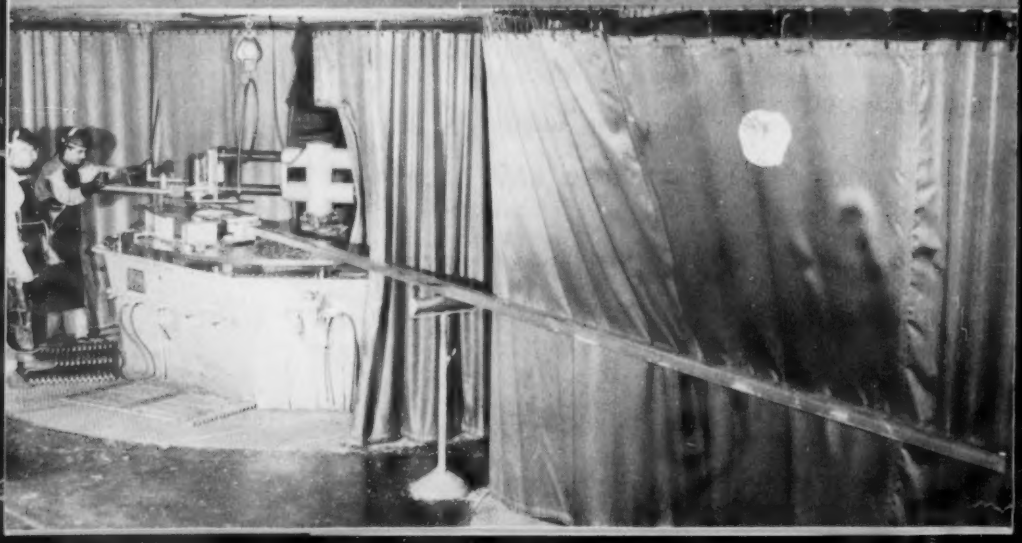
According to the author of this article, tax savings, increased production and reduced maintenance expenses are direct benefits of new equipment installations. Page 160.



# Precision Routing of Aluminum Airframe Parts

*(Above) Conventional routing operation performed with one of the new 7 h.p. Douglas-designed router motors. A toggle switch in one control arm controls the motor; a switch in the other arm controls the hydraulic power system that raises or lowers the router head.*

*(Below) Pantograph router being used for routing one end of a 30-foot airplane wing spar. Savings up to $1,000 per wing spar have been achieved by this routing method rather than doing the same type of work by means of the previously used method.*



## *Intensive research program at Douglas Aircraft results in development of improved routers for hogging and finish-type cuts.*

By GILBERT C. CLOSE

**Routers have always played an important role** in the production of aluminum airframe components. The ability of these machines to route or "duplicate" several parts at one time while guided by a superimposed router block conforming to the shape of the part was a distinct advantage when airframe manufacture reached the mass production stage.

Now, thanks to three years of intensive router production research work carried on at the El Segundo Division of Douglas Aircraft Company, the advantages of the routing process have been greatly extended. This program resulted in the development of specially designed, hydraulically operated radial arm routers, some equipped with pantographic-type duplicators, others with turret air drills, and all of them powered with compact 7 h.p. company-designed router motors that can handle "hogging" cuts on material up to 1 inch thick and finish-type cuts on material upward to 2 inches in thickness. Moreover, these cuts can be held to tolerances well within 0.002 inch.

**As a result of these improvements,** the Douglas El Segundo Division is now routing structural airframe components from solid sections of high-strength aluminum alloys (usually 24S or 75S). Exacting time studies prove that these parts can be routed about eight times as fast as previously and at savings ranging upward to as much as $1,000 per airplane wing spar.

Of the several router developments, the one utilizing a pantographic-type duplicator mounted on the radial arm is perhaps the most revolutionary. Literally speaking, a router so equipped can cut its own guiding template, then "turn around" and reproduce production parts from the pantographed template.

This setup consists essentially of a short swinging arm equipped with a stylus-type guide hinged on the motor-cutting-tool axis. In cutting a guide template, the stylus end of the arm is swung inward (pointing *away* from the operator) and indexed parallel to the router arm. A photo template or master of the part to be routed is mounted on the router table under the stylus. A blank of $\frac{3}{8}$-inch aluminum tool plate is mounted under the cutter. The stylus then traces the photo template or master while the cutter routes an oversize guide template from the tool plate.

In subsequent production of the part, the position of the stylus and cutter is reversed by swinging the stylus arm through 180 degrees and again indexing it parallel to the router arm. The stylus now traces the enlarged pantographed guide template while the inboard motor

*". . . reproducing pantographed guide template directly from master is fast."*

routes the part from material of the required thickness. The router motor and stylus are positioned over the work as necessary by lengthening or shortening the radius of the router arm. Because the stylus arm is hinged at the motor axis, the distance between the stylus and the center of the cutter is always the same.

**The advantages of this system and technique are multifold.** First, reproducing the pantographed guide template directly from the photo template or master is fast and economical. Secondly, as the pantographed guide template is larger than the photo template from which it is reproduced (due to the outboard-inboard relationship of the cutter and stylus on the radial router arm), any errors produced in routing the guide template are proportionately reduced when the positions of the cutter and stylus are reversed and the shape of the guide template is transmitted back to the production part. Thus, for all practical purposes, errors are limited to errors in the original photo template.

A special table with precision, concentric T-slots is used on the pantograph routers. Thus, when the guide template has been routed and the positions of the stylus and cutter are reversed, the blanks from which the production parts will be routed



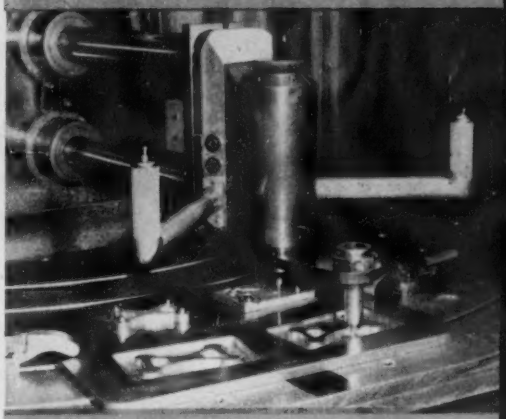
*Line-up of production routers at the El Segundo Division of Douglas Aircraft Company. Lumite curtains surround each router station in order to confine flying chips, but these curtains may be adjusted so that large workpieces can extend outside the station area.*

are mounted in the same place on the table formerly occupied by the photo template or master. The guide template itself is indexed to the precision T-slots so that it can be removed from the table and then accurately remounted for routing future production orders of the same part. In fact, the T-slot tables used on the several pantograph routers are exact duplicates of each other, so that the pantographed guide template can be remounted on any one of the tables not in use at the time future orders must be filled.

Tolerances with the pantograph routers can be held to within 0.002 inch on the radius of the router arm, or to within 0.002 inch along the 10½-foot arc through which the router head swings.

**Improvements in router design itself were accomplished** during the three-year research program. The routers now in use at the Douglas El Segundo Division (and built to company specifications) consist of a vertical column centrally located at the rear of the router table. The radial arm of the router pivots in this column. A hydraulic power unit mounted under the router table is used to control the height of the radial arm. The extensible portion of the radial arm (which slides inward or outward to alter its length) is mounted in linear ball bearings to facilitate movement to follow the work. The router and cutter are rigidly mounted on the extremity of this extensible arm.

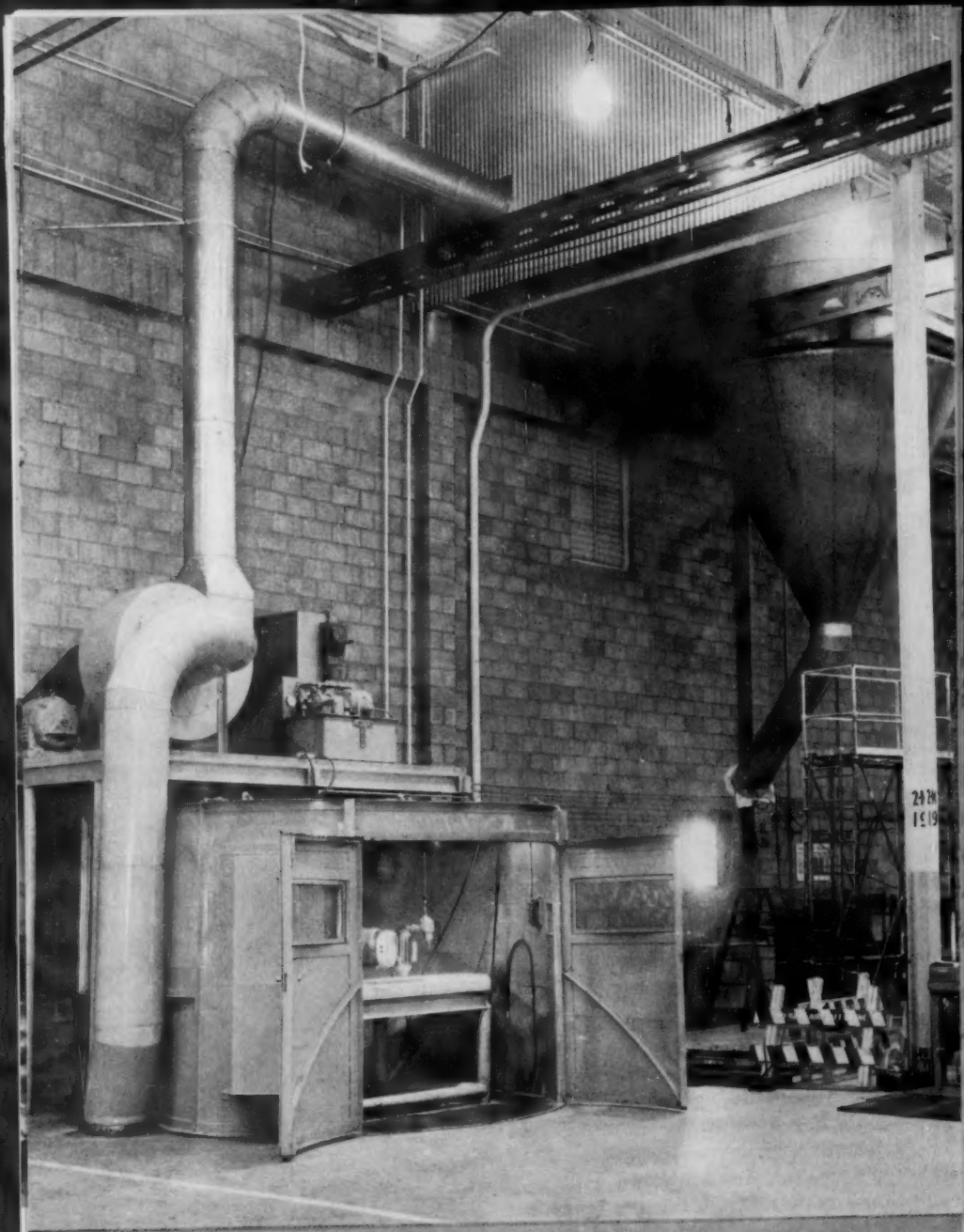
The tables used on the conventional routers (not the pantograph routers) are of welded steel plate faced with thick plywood. The work



*Pantograph router set up for production operation. Note the outwardly turned stylus guide which is following the pantographed guide template. When the guide template was cut, the stylus was turned inward so as to follow a photo template.*



*The five turret air drill shown in the above illustration is mounted on the opposite end of the radial arm from the router motor.*



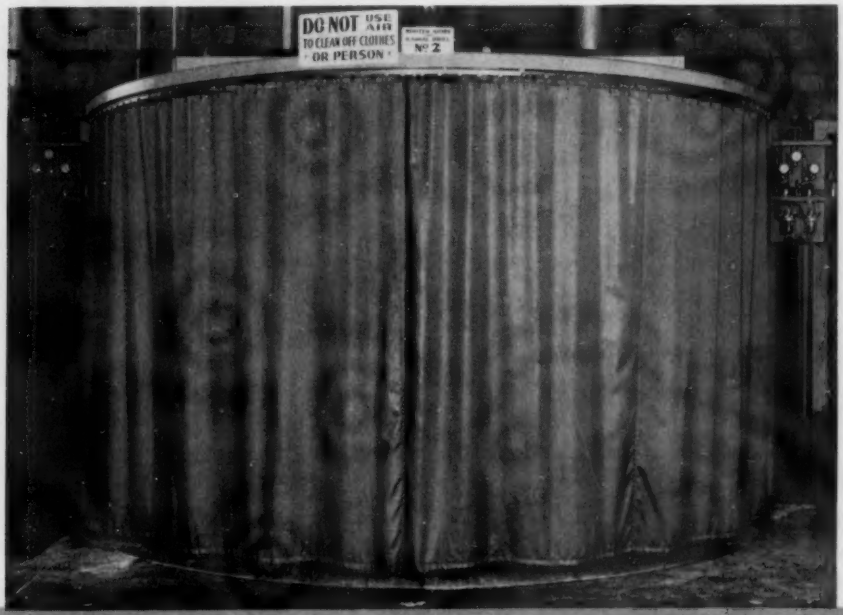
*Router chips are removed after falling into conical floor trap by this air exhaust system.*

*"Each router station is surrounded by heavy Lumite curtains."*

to be routed is screwed down on this plywood top after it has been correctly positioned. The router itself is mounted on a circular steel grating in the floor which in turn tops a conical pit into which the chips fall and are carried away by an air exhaust system. Each router station is surrounded by heavy Lumite curtains mounted on drapery-type rails to contain the router chips and prevent them from flying into adjacent areas. These curtains may be positioned at will on the drapery-type rails so that work too large to be contained within the enclosure may extend between the curtains.

The five turret air drill mounted on the conventional routers (not the pantograph routers) is another development springing from the three-year research program. The turret drill is mounted on the opposite end of the movable arm from the motor and cutter. Thus, when it becomes necessary to use the drill, the arm is merely rotated through 180 degrees to bring the drill into position over the work.

**Nearly all work to be routed must be pre-drilled** for hold-down screws and also pre-drilled with rivet pilot holes. The turret drill is very handy for this type of work. First, a drill template is placed over the work stack, the turret drill is swung



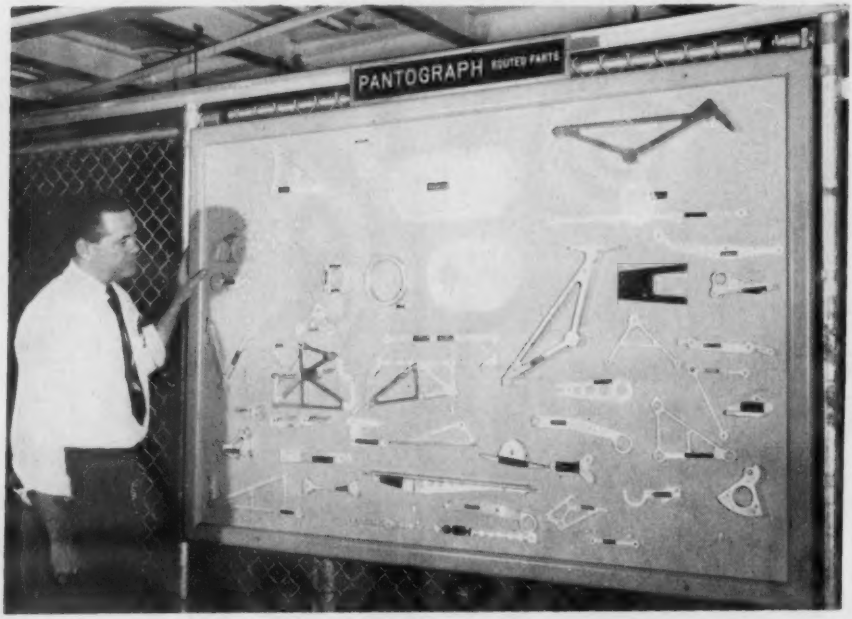

*Router station with Lumite curtains tightly closed in order to prevent flying chips.*

*". . . high-cycle router motor operates at 360 cycles at 220 volts, at a speed of 21,100 r.p.m."*

into position, and the necessary holes are drilled. Hexagonal-head wood screws are then driven through the work and into the plywood table top by a pneumatic nut-runner suspended on a cord over each router station. Next, a drill template for the rivet pilot holes is positioned and the holes are drilled. The wood screws are then removed, the router block is superimposed on the work, and longer hold-down screws are driven through both the router block and work blanks.

Each of the five turret drill stations is equipped with its own air motor. A pneumatic guide foot in front of each drill chuck serves as a drill bushing retainer and provides additional hold-down pressure during drilling. Four of the guide feet are provided with press-fitted drill bushings for the more popular drill sizes. The fifth guide foot accommodates a slip-fit drill bushing which is easily interchangeable for different size drills.

Operating arms extend from each side of the turret drill so that it may be conveniently stationed over the hole to be drilled. A button in one of these arms is used to control the




*Display board of production parts now being routed at the Douglas El Segundo plant.*

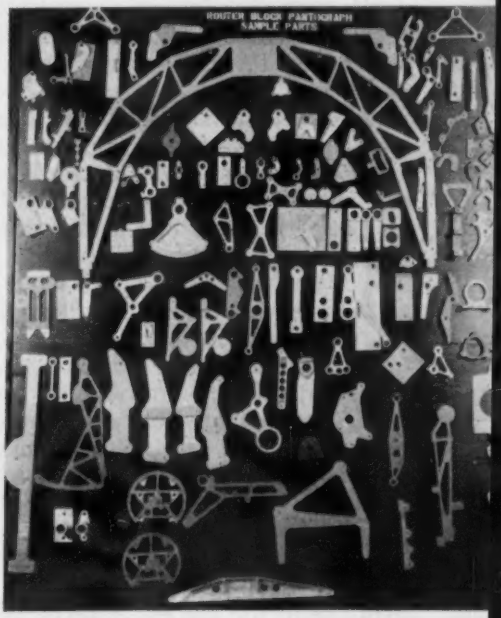
hydraulic power unit which raises and lowers the radial router arm; a button in the other arm controls the air motor. When the drill is advanced into the work, the pneumatic guide foot retracts but maintains a pressure of about 150 lb. on the work to aid hold-down and to press the work sheets together so that drill chips cannot enter between them.

The speed and efficiency of this turret drill addition to the router are quite obvious. During setup of the job, the drill has merely to be swung into position over the work. After setup, the router arm is merely swung through 180 degrees to bring the motor and cutter into position over the work.

**As a culminating touch to their router production research program,** Douglas engineers designed (and had built in the company's own shops) a high-cycle router motor which is said to pack 7 h.p. into the same physical dimensions normally occupied by 3 h.p. high-cycle motors. It operates at 360 cycles at 220 volts, at a speed of 21,100 r.p.m. A 10 kva. motor alternator with automatic voltage control supplies the current.

The size of this motor in relation to the power it develops was kept small by radical innovations for cooling. The oil mist used as a coolant for the cutter is circulated first through a spiral groove in the outer case of the motor before being ejected onto the cutter, thus carrying away the heat generated in the back iron of the motor. Another oil mist stream at 100 p.s.i. is directed through the upper bearings of the motor, down an air gap and then out through the lower bearings, thus carrying away heat from within the motor itself. This bearing oil mist stream continues to operate even when the motor is shut off so that chips will not enter the bearing while air-cleaning the router collet during cutter changes. The bearing mist stream cuts off automatically when the alternator is stopped.

The extra power of this motor made possible by the unique provisions for cooling, plus the pressure mist oil system for the bearings, makes it possible to route unusually heavy work. Two of the illustrations with this article show display boards containing parts now being accurately routed at the El Segundo Division of the Douglas Aircraft Company.




*Another group of parts now being routed.*

# Magnetic Chuck

***Holes down to 0.001 inch in diameter can be drilled; drill runout is instantly corrected by simple truing operation.***



*Fig. 1—(Above) Dumore Micro-Drill equipped with magnetic chuck.*

**A novel magnetic chuck which easily and quickly compensates for drill runout** is being used with excellent results on a new small precision drill press (Fig. 1) manufactured by The Dumore Company, Racine, Wisconsin, for holes down to 0.001 inch in diameter. Any drill runout is instantly corrected by a simple truing operation that consists of touching the shank of a rotating drill with either a pencil point or fingernail.

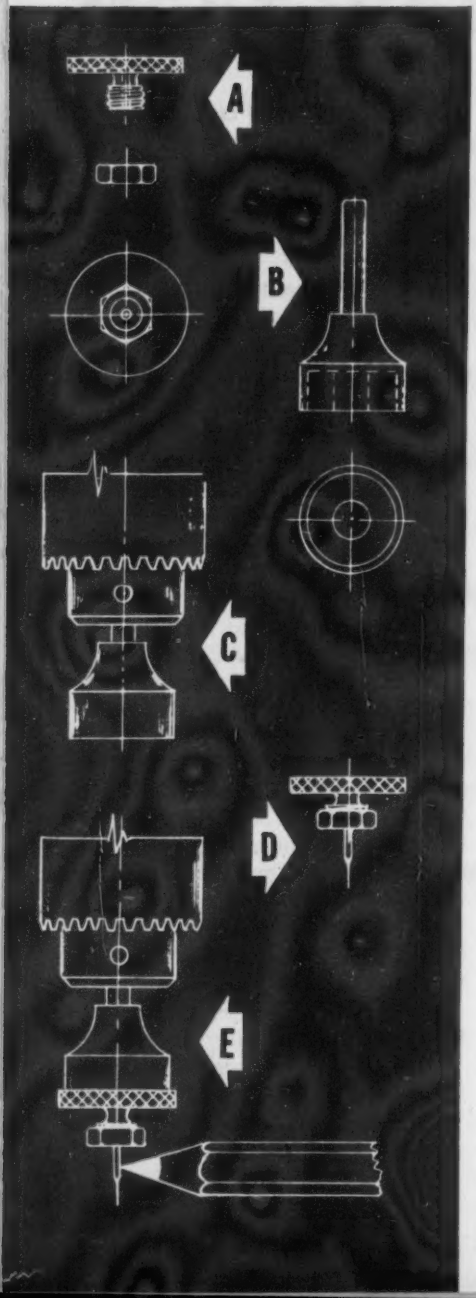
Accurate chucking and the maintenance of drill concentricity are major obstacles to the successful drilling of holes in the micro drill range. So critical is this phase of the setup that manufacturers have devised all sorts of elaborate methods and equipment in an effort to provide and maintain the accuracy required. For example, a drill 0.002 inch in diameter with a runout of 0.0005 inch is equivalent to ¼-inch runout on a drill 1 inch in diameter. All too frequently runout barely visible even with optical aid is a major contributor to drill fractures.

**Experts on micro-drilling agree** that the most vital factor affecting drill life in the successful *performance* of the operation is the trueness and concentricity with which the drill turns. Quick compensation for drill inaccuracy is possible with the magnetic chuck, providing concentric drill rotation which is maintained during the drilling cycle.

While the drill press is equipped with a commercial type chuck, it is not normally used to hold the very small sizes of drills 0.020 inch and smaller. For drills in this range, the chuck serves as a holding device for magnetic driver to which collet and drill are subsequently attached.

As shown in Fig. 2, the magnetic chuck consists of two parts; namely, a stainless steel disc or collet *A* and an aluminum driver *B* shaped like an acorn with an attached shank. Pressed into the base of the driver is a permanent Alnico magnet to provide the holding force. The attraction is strong enough to hold collet and drill securely without losing concentricity, yet fluid enough to al-

# Facilitates Drilling Operations




low for easy, quick centering when changing drills.

After installing holder into the Jacobs chuck, as shown at *C*, the selected drill is inserted into the collet and locked by tightening a nut *D*. The collet, held between thumb and forefinger, is then attached to the rotating driver. Drill runout will be immediately apparent and a mere touch of the drill shank with pencil (as shown at *E*) or fingernail adjusts collet position for perfect concentricity of rotation. Where drills of different diameters are used intermittently, considerable time can be saved by using extra collets holding the various sizes of drills and quickly interchanging them as required. This type of chucking device provides an extremely quick method of changing drills and an accurate, simple way of truing, which is done while the machine is in operation. There is no need to shut off the drill press when changing drills.

The complete kit, packed in an attractive wooden case, consists of two drivers—one for drills up to 0.006 inch and the other for drills from 0.007 to 0.020 inch. Since most commercially available drills, whether of the spiral or flat type, have oversize shanks, 0.030, 0.040 and 0.061 inch in diameter, three collets in these sizes are standard equipment.

*Fig. 2—(Left) Drawing showing the parious components parts of the magnetic chuck and the manner in which the chuck is used.*

# FORMING *Aerodynamic* STRUCTURES

***A picture story of operations performed at Pastushin Aircraft in fabricating sheet metal airplane parts to rigid specifications.***

By IRA S. ROBERTS

**The supersonic airplane has injected a whole new series of problems** into the already overwhelmingly complex task of producing a superstrong structure of minimum weight and maximum margins of safety. Now, more than ever before, each airplane component must be perfect as it stands, minus any defficiencies, real or implied, that will make it depend on other parts after it is installed on the airplane. Design has been trimmed to maximum utility and minimum weight, and it is up to the various shop fabrication sections to produce these designs to meet the rigid engineering specifications.

The many formed sheet metal parts used on the modern high-speed airplane fall within this critical category—especially those parts which become a part of the aerodynamic surface of the airplane. Shape tolerances which a few years ago would have seemed critical for a machined bearing surface must be consistently met. There are several reasons for this. First, any irregularities in the shape of the formed aerodynamic surface will set up some resistance to air flowing over it, and will induce a parasitic load factor called "drag." This drag load increases with air speed, and even a very small amount of drag at subsonic speed becomes serious at supersonic speeds.

Secondly, the drag load on an aerodynamic surface must be absorbed by the structure to which it is attached. Thus, close tolerance forming to reduce drag minimizes size and weight requirements of the airframe proper. Third, and very important in conjunction with supersonic speeds, the aerodynamic surface must be smooth to reduce heat caused by friction with the air. This factor is becoming more and more important as air speeds increase, and may be the limiting factor in ultimate attainable speeds by inhabited airplanes.

**With so many things hinging on its successful accomplishment,** it is only natural that sheet metal forming has become a specialized activity within the aircraft industry. Firms have been organized to do this work on a sub-contract basis. Pastushin Aviation Corporation, Los Angeles, California, is one such firm

***". . . built first hydropress from scrap and rejected parts."***

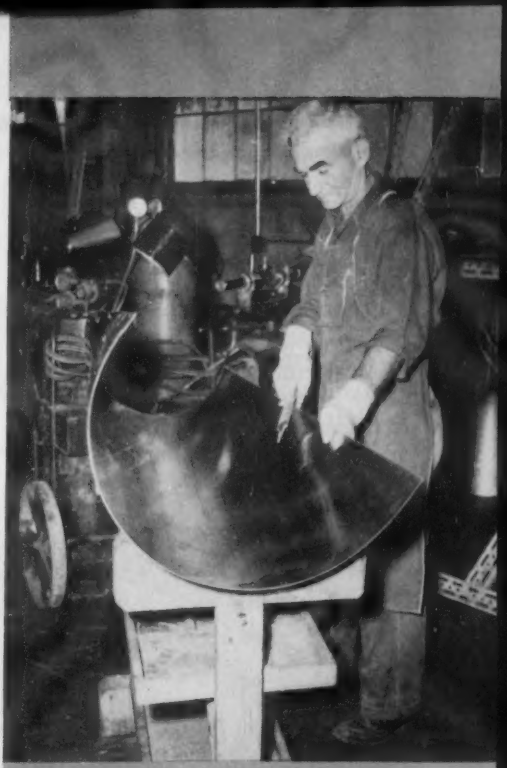
with an outstanding record of achievements in the critical sheet metal forming field.

In fact, Pastushin's record could be resolved in a verbal challenge to the airframe industry . . . "You design it; we'll form it." In many cases of record, the airframe industry has accepted this challenge and Pastushin engineers have delivered the goods.

This company has built its reputation, not on new and revolutionary forming methods, but by improving basic forming techniques to a point where a near perfect part is routine, not accidental. The refinements of in-process techniques that have made this possible will be of interest to anyone engaged in forming sheet metal.

Vic Pastushin himself, company president and founder, has been engaged in sheet metal forming for the aircraft industry since the days when most such parts were formed by hand, using a rubber or rawhide mallet and a form block made of wood. Pastushin built his own first hydropress from scrap and rejected parts obtained from a hydropress manufacturer. The base for this first machine was heat treated in an open field, in a pit, with glowing coals heaped around and over it. This was in the days when priorities, not money, established purchasing power. This hydropress is still in use at the company.

Since that time, Pastushin and the

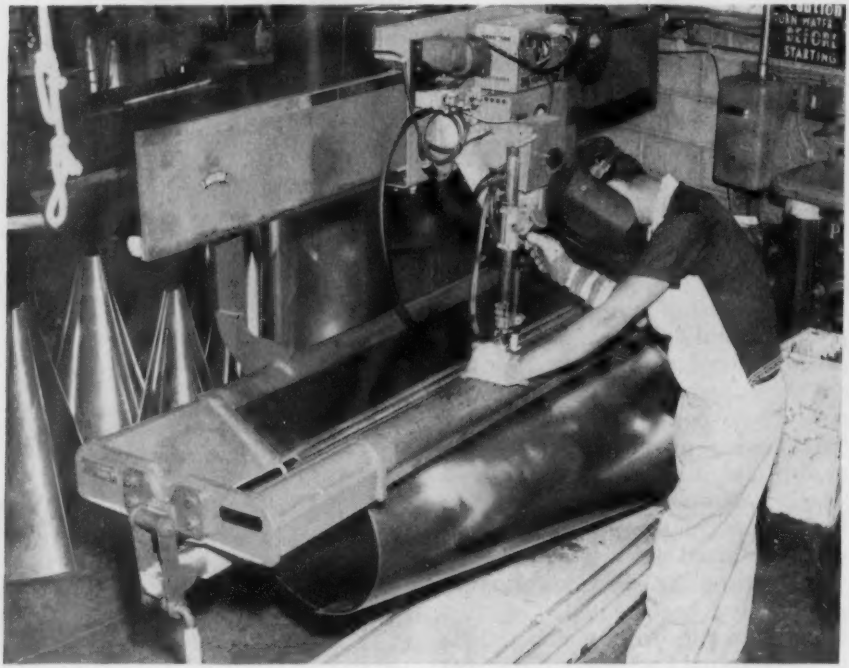


*After the sheet metal is sheared and rolled into an approximate aerodynamic contour, all components enter the hand filing department. This is one of the most important operations in Pastushin's quality control program. Each edge to be welded is "draw filed" (the file is always pulled toward the operator) down to bare, flat metal, making sure that all burrs and edge irregularities are removed. This makes for a clean, smooth weld bead, minus gaps, pockets and other irregular inclusions. Next, the edges to be welded are filed to a 45-degree chamfer that extends about half the thickness of the sheet on the side opposite the weld bead. This chamfer permits 100 per cent penetration during welding, along with good alloying of the base metal and filler rod metal, as the weld nugget extends completely through the material and into the shallow groove in the welding machine chill bar. Using this particular procedure, a minimum number of components are rejected because of poor weld bead structure.*

*". . . company noted for ability to design new forming machines or improve old ones . . ."*

company he formed have become noted for their ability to design new forming machines, or improve old ones, in the interest of better sheet metal forming practices. The wide range of metal forming tooling now in use hints at this company axiom . . . "Never do by hand that which can be done better on a machine."

The aerodynamic sheet metal shapes that are now being production-formed at Pastushin include missile skins, airplane drop tanks, and jet engine accessory covers. Most of these are external components and their external contours help form the aerodynamic pattern of the airplane or missile. The nu-

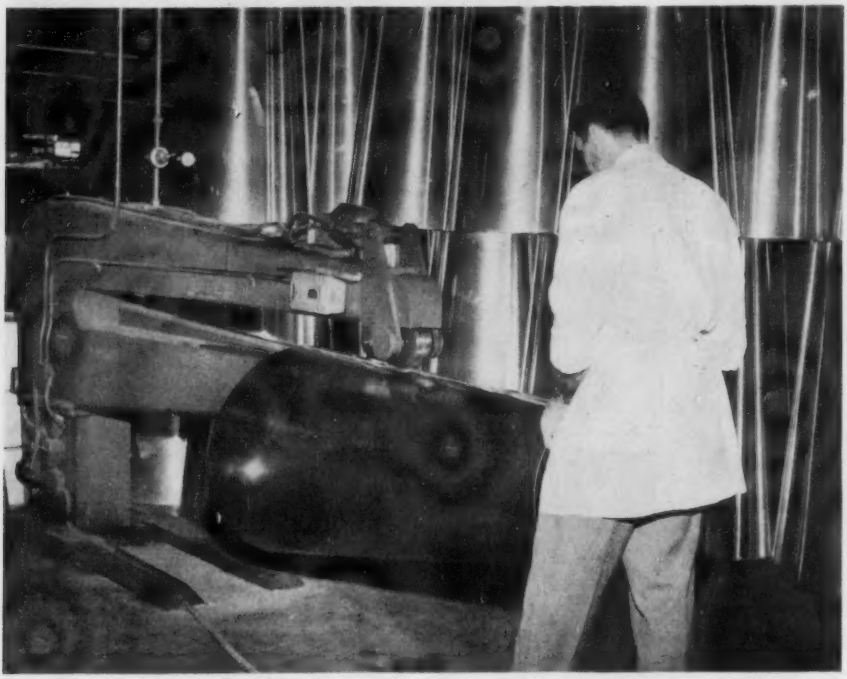


*After tiling, the parts are edge-matched in this automatic seam welder. Pneumatic fingers in the machine table grip the edges of the components and force them tightly together. Reel-fed filler rod is used on all parts requiring a filler metal. Each of these automatic welders is qualified for a series of machine settings, and operators are required to stay within 5 per cent of the qualified setting. The welding speed employed for the operation depends upon the particular alloy that is being welded and the thickness of same.*

***". . . each illustration with its explanatory material stands as a possible suggestion for others interested in improving techniques."***

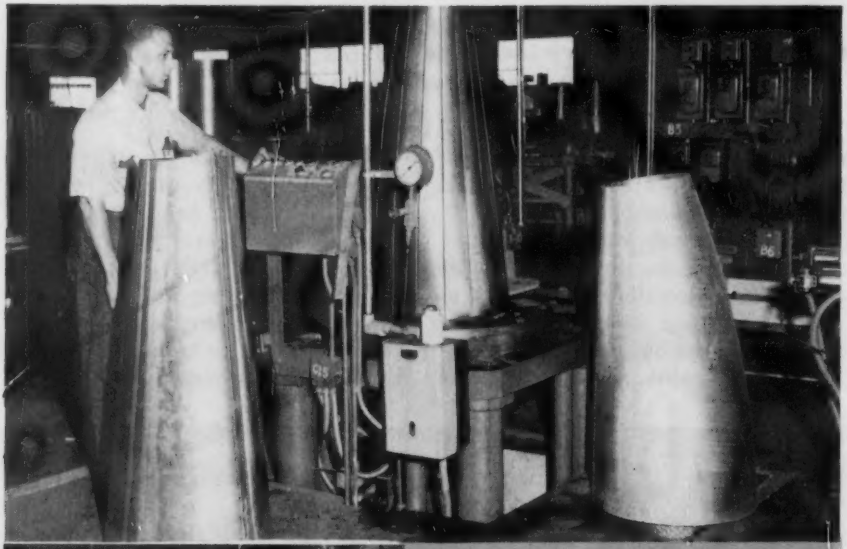
merous problems mentioned at the beginning of this article are involved in each component.

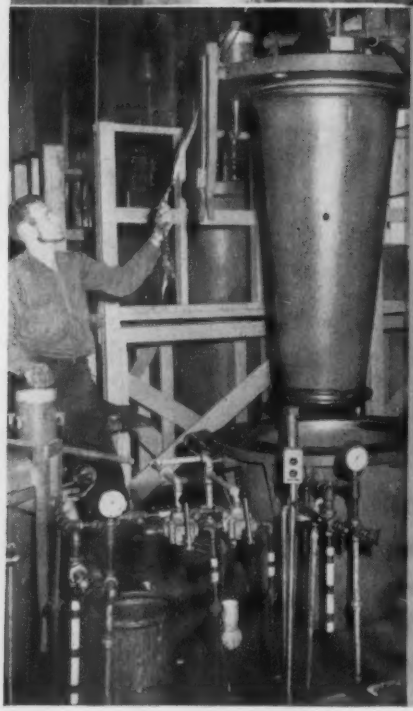
The somewhat lengthy captions accompanying the illustrations with this article describe in detail the various forming operations necessary in producing one of these critical sheet metal components, and how each operation contributes to the overall quality of the part involved. Presented in this way, each illustration with its explanatory caption material stands as a possible suggestion for other individuals who are interested in improving the sheet metal forming techniques they are currently employing in their shop.



*Each weld seam is planished on this automatic roll planishing machine. Planishing pressure is about 20,000 p.s.i. This cold works the cast weld metal sufficiently to increase its strength and ductility to a degree comparable to the base metal on either side of the weld seam. When parts are welded slightly undersize, enough planishing pressure can be used to elongate the weld metal slightly, thus slightly increasing the diameter of the part. This factor is claimed to have no effect on the overall quality of the weld seam.*

## *Forming Aerodynamic Structures . . .*

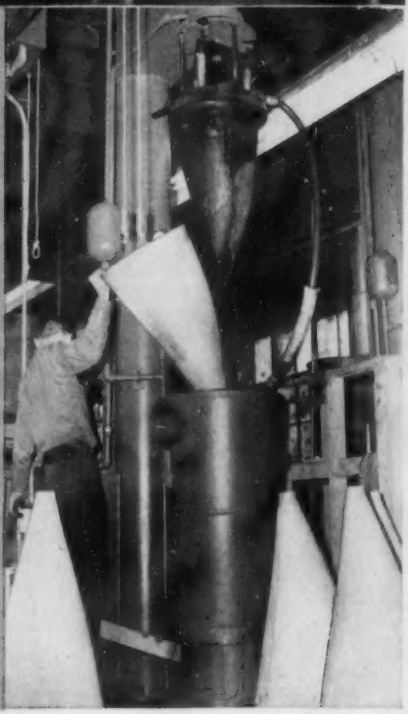




*(Above) After the aerodynamic structures have been seam welded and weld seam planished, they are ready for forming. One of several forming techniques may be used, depending upon the type of part, the necessary tolerances, and the number of parts to be produced. The machine shown employs a hydraulically-driven, but mechanical expanding forming mandrel. Forming is accomplished evenly throughout the part all at one time. This method of forming is specified for many military airplane parts. Although no forming lubricant is used, the die surfaces are kept in a smoothly polished condition at all times. Even the slightest die mark must be removed before forming continues.*

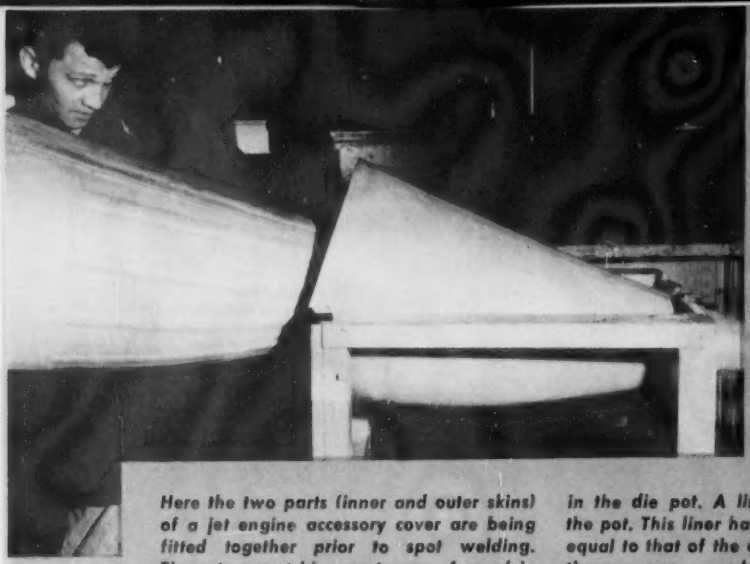
*(Left) Company-designed pneumatic pot and plug metal forming machine is used for forming tubular or conical sections that are air-tight throughout their length. Note large rubber O-rings around the top and bottom of the plug. These act to seal air leakage from either end of the part being formed. Compressed air is admitted between the part and plug through holes in the plug (one plug air vent is visible in the illustration). Average forming requires air pressure at about 500 pounds per square inch.*





*(Above) Short-length circular aerodynamic structure components are being formed in a hydropress, using a rubber plug that is compressed into a high-pressure cage. The rubber expands against the part and forces it into the sidewall dies. Extremely close tolerances can be obtained with this method of forming. The die is made up of segments with slightly tapered backs. These tapered die segment backs seat against a similar taper on the high-pressure cage wall. The taper is in a 10 to 1 ratio, so that shimming die segments 0.010 inch in either direction produces die diameter change of only 0.001 inch. Parts may be formed after welding, or prior to welding with unwelded ends lapped.*

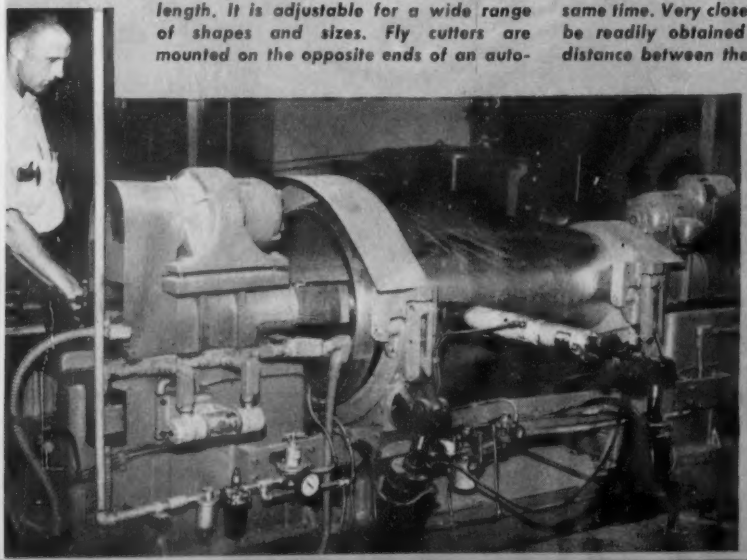
*(Right) A Pastushin-designed rubber bag sheet metal forming machine. The rubber bag is expanded inside the part by hydraulic pressure, forcing the metal against the sidewalls of the pot-shaped die. From 450 to 550 p.s.i. of hydraulic pressure is used. A unique feature of this machine is that it forms progressively. The rubber bag expands progressively from the small end upward, thus not only forcing the metal against the die walls, but acting to "iron out" any wrinkles that may occur during forming.*

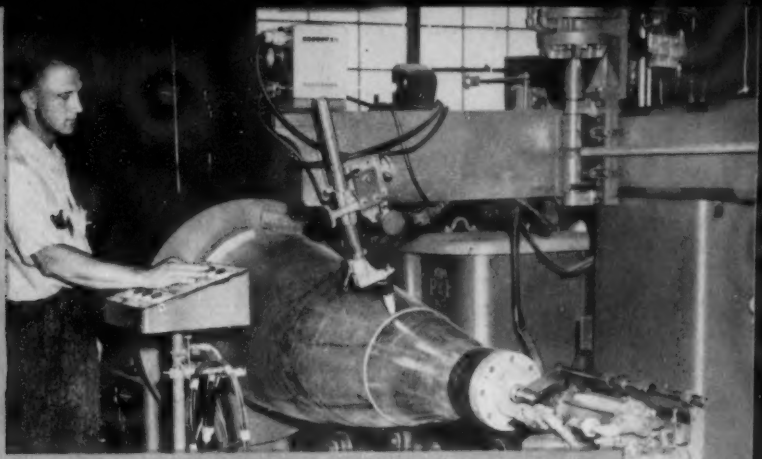


*Here the two parts (inner and outer skins) of a jet engine accessory cover are being fitted together prior to spot welding. These two matching parts were formed in the same pot on the rubber bag forming machine to obtain identical contours and a close fit. The outer skin is formed first in the die pot. A liner is then placed in the pot. This liner has a sidewall thickness equal to that of the outer skin, along with the necessary convolusions for forming the integral risers. The inner skin is then formed in this liner. This provides a perfect fit when the parts are matched.*

## *Forming Aerodynamic Structures . . .*

*This automatic cut-off machine is used for trimming the aerodynamic sections to length. It is adjustable for a wide range of shapes and sizes. Fly cutters are mounted on the opposite ends of an automatically expanding arm at each end. Both ends of the part are trimmed at the same time. Very close length tolerances can be readily obtained by preadjusting the distance between the revolving fly cutters.*





*Here the end cap of a conical section is being welded in place on an automatic circumferential welder. The base portion is held in place by segmented expanding mandrels. The nose portion is positioned by a pneumatically actuated nose pad. Prior to clamping the nose in place, an oversize bulkhead is placed between them, with the extra size of the bulkhead protruding to form a burn-down flange. No filler rod is used when this burn-down flange is available. All welding operations performed on the end cap are done by means of the shielded arc method*

*A very simple technique is employed at Pastushin to determine actual elongation in all areas. Prior to forming, the part is stripped with 1-inch wide masking tape and then sprayed with primer. The masking tape is then stripped away and the part formed. Measuring the width of the unprimed metal strip after forming gives reliable data pertaining to metal displacement occurring in that specific area.*

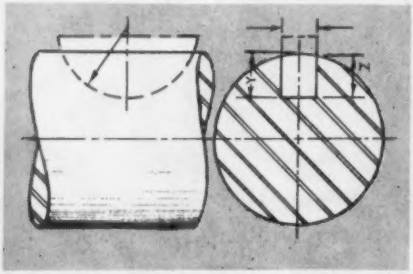


# Keying by the Woodruff Method

***In addition to discussing the advantages of this method, the author presents helpful hints regarding the use of Woodruff keys.***

By FRED ROGERS

**Wherever short inserted keys are used,** the Woodruff key has much in its favor with regard to design, simplicity, speed of machining, application and efficiency. The suggestions contained in this article are of a most practical nature and should prove most helpful to the machine designer, the detail draftsman, as well as the machinist in the shop.



*(To be continued in next months issue) Fig. 1—This sketch shows a side view (left) and cross-sectional end view (right) of an assembly in which a Woodruff type of key is utilized as the keying medium.*

With any form of key, whether it be Woodruff as shown in Fig. 1, square, rectangular and feather as shown in Fig. 2, or tapered or gib head (not shown), that part of the key that is sunk into the shaft and the part that extends above the shaft after assembling are measured at the sides of the key (see dimension *Z*, Figs. 1 and 2). Obviously, this is for the convenience of the inspector. However, it is not the way the machinist begins to cut the keyway. He starts from the top of the shaft on the vertical axis, as shown at *A* in Fig. 3, and must sink his cutter into the shaft until it appears as shown at *B* in Fig. 3. Dimension *X*, the height of which depends upon the width of the cutter and on the di-

ameter of the shaft to be keyseated, must be calculated. On many correctly executed detail drawings one sees the exact dimension from the side of the keyway to the bottom but the height of the segment $X$ in Fig. 3 is not accounted for; therefore, the machinist is required to do some calculating on his own. This is common practice in many shops. However, it is the contention of the writer that the engineering department should engineer and that the machine shop should machine. It seems all wrong for the engineer to place the responsibility of calculations upon the machinist. Shops in which a methods department is established, usually have this practice corrected. No methods man should allow time for the machinist to juggle figures when it is a simple matter to have them placed on the drawing. Therefore, the draftsman should incorporate another figure, designated as $Y$ in Fig. 1, and in one more instance come up with "that nearly perfectly dimensioned drawing."

**For the convenience of the draftsman,** the basic equation for calculating the height of the segment $X$ in Fig. 3 is:

$$X = \frac{D}{2} - \sqrt{\frac{D^2 - W^2}{4}}$$

Where $X$ = Height of the segment.
$D$ = Diameter of the shaft.
$W$ = Width of the key.

If the person who does the calculating wants to analyze and resolve this equation further, it can be simplified to

$$X = R - \sqrt{R^2 - \left(\frac{W}{2}\right)^2}$$

Where $R$ = Radius of the shaft.
$W$ = Width of the key.

For example, a 2-inch diameter shaft has a keyway ½ inch wide key, as indicated in Fig. 3. (The observing reader will immediately recognize that the widest A.S.A. standard key is ⅜ inch wide, but these values are used here because of the ease with which they may be handled.) The triangle to solve has a ¼-inch opposite side and a 1-inch hypotenus. The adjacent side of this triangle must be calculated, becoming the square root of the difference of

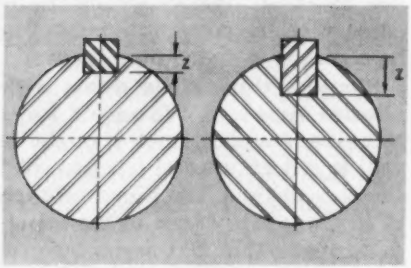



*Fig. 2—(Left) Cross-sectional sketch of an assembly utilizing a square type of key. (Right) Cross-sectional sketch of an assembly utilizing a rectangular type of key.*

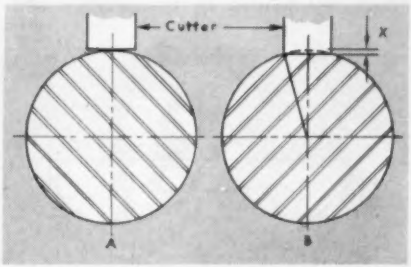



*Fig. 3—In cutting a keyway, machinist starts from top of shaft on vertical axis, as shown at (A). He must sink cutter into shaft until it assumes position shown at (B).*

*". . . observations disclosed a number of methods for finding the center of the shaft . . ."*

the squares of the other two sides. This value is then subtracted from the radius of the shaft and is solved as follows:

$$X = 1 - \sqrt{1^2 - 1/4^2}$$
$$= 1 - \sqrt{1 - 1/16}$$
$$= 1 - \sqrt{15/16}$$
$$= 1.000 - 0.9682 = 0.0318$$

Therefore, the cutter must be sunk into the shaft 0.0318 inch in addition to the customary depth of the keyway. This procedure will seem quite elementary to the seasoned draftsman but it has been included here for those who like to analyze their problems and also for the machinist whose "book learning" has been on the short side.

**Regarding setup preparatory to the actual cutting operation,** several observations disclosed a number of methods for finding the center of the shaft so that the assembled key would be reasonably central. Some years back, it was customary for the machinist to have cigarette papers in his tool chest. These paper "feelers," a couple of thousandths thick, were used between the rotating cutter and the work. When the cutter dragged the paper out of the operator's hand it was "practically" touching the shaft. The cutter was then centered by eye over the small oval cut made at the top of the shaft.

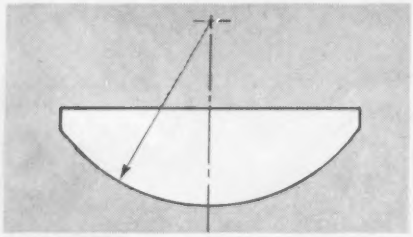


*Fig. 4—Sketch showing type of Woodruff key which is used extensively today even after 26 years of standardization have elapsed.*

An accurate method of centering the cutter consists of placing a square on the table of the milling machine with the blade tangent to the diameter in which the cut is to be made and passing a gage block between the blade of the square and the side of the cutter. The thickness of the block would, of course, be the difference between the radius of the shaft and half the width of the cutter. Some operators measure this distance with a steel scale graduated in 64ths and then place the square on the other side of the shaft and measure again. If the two dimensions agree, then the cutter is supposed to be centrally situated over the work.

**Because this article deals with special types of Woodruff keys** as well as standard ones, it might be well to reflect on what has preceded the present time. The Woodruff type of key was introduced to the manufacturing public 60 years ago in 1896 by the Whitney Manufacturing Company of Hartford, Connecticut. This company is now known as the Whitney Chain Co., still in Hart-

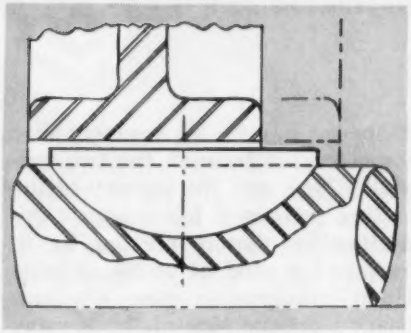


*Fig. 5—Sketch of an assembly in which a feather key effect is required due to movement of the mating piece along the shaft.*

ford. The Woodruff key is sometimes called the Whitney key. Until the year of 1930, the number of various size keys available in English measurement was 65 and an additional 57 sizes in metric measurement. In that year of 1930, after a start had been made in 1922 to standardize Woodruff keys, the American Standards Association issued a list of standardized keys. This reduced the number from 65 to 27 sizes ranging from Number 204 (1/16 x ½ inch) through Number 1212 (⅜ x 1½ inch). The numbering system is novel in that the key sizes are divulged by the key number. Number 204 signifies 2/32 wide and 04/8 long or 1/16 inch wide by ½ inch long.

Whereas the former list contained numbered keys and lettered keys interspersed with one another, the A.S.A. list abolished the lettered keys and numerous numbered keys. Perusing both lists we find that prior to standardization, there were 6 shorter keys than Number 204 and 7 intermediate keys between Number 204 and Number 1212 sizes. The elimination of these 13 sizes probably did not cause great inconvenience to the machinist and designer. However, of the other 25 keys longer and some of these wider in the old system, there arises a difference of opinion. It should not be construed that this article advocates disagreement with the present trends toward more and better standardization, but 1½ inches is the longest length and ⅜ inch is the maximum width available from the A.S.A. listing. Elimination has been made of the type of Woodruff key shown in Fig. 4 which is used extensively today , even after 26 years of standardization have elapsed.

**Cutters are used for keys** 3/16 to ¾ inch thick and from 2⅛ to 3½ inches in diameter. The lengths of keys for these diameters are 1¾, 2, 2 5/16 and 2⅞ inches. This type of key was originally designed so that the depth of cut in the shaft would not be excessive. The sketch in Fig. 4 shows why there is a difference between the diameter of cutter used and the length of the key, because only the lower part of the circle is utilized for the key. These

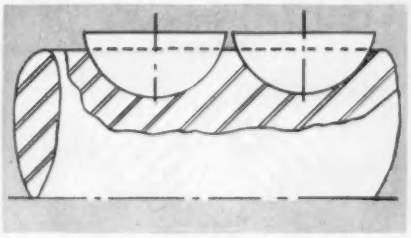


*Fig. 6—The same effect as in Fig. 5 can be obtained when the single special key is replaced by two ⅜ x 1½-inch keys as shown.*

*". . . too many times the draftsman leaves too much to the machinist's imagination . . ."*

longer keys are used (1) when the load to be transmitted requires a length greater than 1½ inches (maximum under A.S.A. standardization), and (2) when there is movement of the mating piece along the shaft, where a feather key effect is required. The latter condition is shown in a partial assembly in Fig. 5. The key in this installation is ⅜ inch wide and 2⅞ inches long. The movement along the shaft is ⅞ inch. The key is sunk into the 3-inch diameter shaft ¾ inch deep.

The same effect can be attained when the single special key in Fig. 5 is replaced by two keys ⅜ inch wide by 1½ inches long, each located in line, one next to the other, as indicated in Fig. 6. However, if the assembled keys are not absolutely in line it is possible that only one key will take all the load. It has happened in such an assembly that the clearance between the two out-of-line keys and the keyway of the mating piece was taken up on opposite sides, thereby creating the illusion of a good fit without shake. Upon examination, one key was bearing on one side of the keyway while the other key was bearing on the opposite side. Therefore, only one key was shouldering the load during rotation.

**A properly dimensioned Woodruff key slot** is shown in Fig. 1 in which the width of the slot, the side depth, the depth from the top and the radius are given in the two views. In looking over many drawings of parts containing Woodruff keys, one is struck with the thought that too many times the draftsman leaves too much to the machinist's imagination to do a good job with-

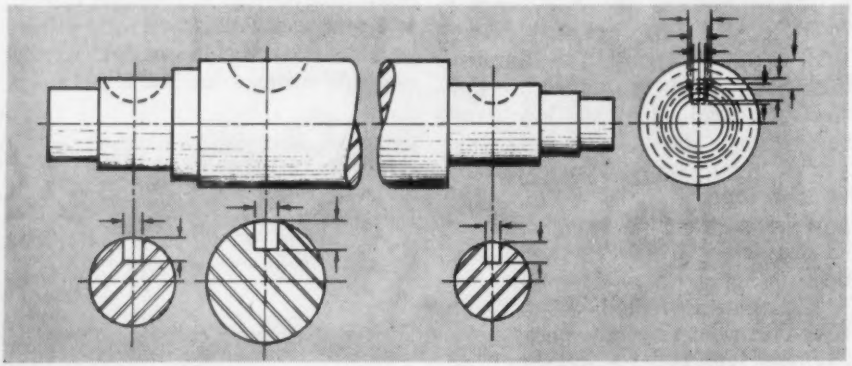


*Fig. 7—Composite drawing of parts containing Woodruff keys in which the key slots have not been dimensioned in the proper manner by the draftsman, thus making it a very difficult procedure for the machinist to accurately machine keyways in the various parts.*

out the proper information. A good example is shown in the composite drawing in Fig. 7. The draftsman had dutifully and correctly located his keyways longitudinally from the shaft shoulders; he had the proper notes giving the numbers of the three different keys, but his end view showing the depths of the keyways was a puzzle to solve. Machinists should not be required or expected to solve draftsmen's puzzles or better still, his indiscretions. True, it was a matter of projection, but how much nicer it would have been to show the three sections on the key center lines below the main view of the shaft as illustrated; or how much better had the engineer designed for the greatest load and made the three keys the same width and length. Referring again to the end view, how deep is the keyway and from where—the top or side of the keyseat?

Another common inconsistency on detail drawings is to show a plan view of the keyway, either in a whole view of the shaft or partially. The plan view of a Woodruff key is always in the form of a rectangle and, except for a width dimension, is of no use to the machinist. The width can either be shown in the end view, which is the usual procedure, or, in the case of a multiple application as shown in Fig. 7, can be shown in sections. Ordinarily a feather key slot closed at one or both ends is shown in a plan view to illustrate the half round shape at the ends of the key. This is not necessary for a Woodruff key.

**Dimensioning the depth of the keyway** for a Woodruff key on the tapered portion of a shaft is another

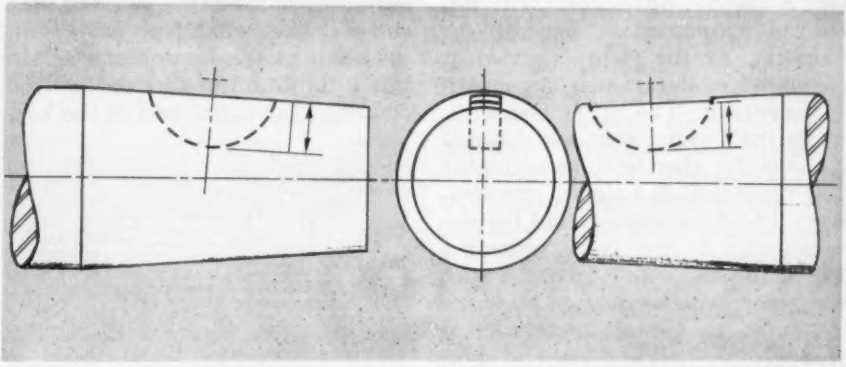


*Fig. 8—Dimensioning the depth of the keyway for a Woodruff key on the tapered portion of a shaft is another instance where the wrong procedure can be used, as shown in left-hand view in this sketch. Right-hand view shows method which is generally acceptable.*

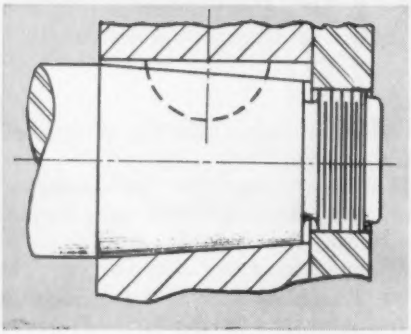


*Fig. 9—To overcome difficulties encountered in producing a keyway in the tapered surface of a shaft, the keyway is sometimes machined parallel to the axis of the shaft, in the manner clearly indicated in this particular sketch.*

instance where the wrong procedure can be used and indeed is sometimes seen on detail drawings. The wrong way is illustrated in the left-hand view of Fig. 8. The depth is shown from the top of the shaft and makes the machinist wonder what is meant by the detailer. It is obvious that the end view shown centrally in the sketch has no place for a depth dimension but can readily accommodate a width dimension. At the right is shown a suggested method which is generally acceptable. The upper line within the half round shape is depressed slightly (better to exaggerate) and represents the side of the keyway. The dimension should be perpendicular to the taper when the top of the key is to be parallel with the taper. Another way to show the depth is to take a cross section through the shaft and key and show as in Fig. 7. This method, however, will not show whether the depth is perpendicular to the taper or not,

***"Sometimes the keyway is machined parallel to the axis."***

and this fact must be assumed by the machinist.

When the top of the key is shown parallel to the tapered surface of the shaft, the keyway in the bore of the mating piece will be the same depth for the length of the hole. This requires tilting the mating piece when broaching or slotting. Sometimes to overcome this condition, the keyway is machined parallel to the axis, as shown in Fig. 9. In this case the key should be assembled so that the top is parallel to the axis and the keyway depth so dimensioned. The only advantage gained is that the mating piece does not have to be tilted when broaching or shaping the keyway. In the sketch shown in Fig. 9, the angle of the taper is comparatively small. The area of key contact is the same as a standard straight assembly relative to the outer member. However, if the taper is steep, one end of the key will not protrude from the shaft at the large diameter. In this instance all of the load will be concentrated at one end of the key.

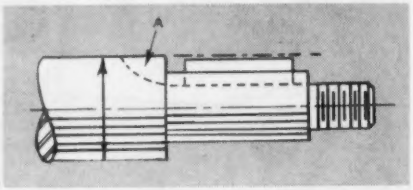



*Fig. 10—Since a square key which is loosely fitted will tend to rock in its keyway when under load, the key should be pressed into the shaft before assembly of parts begins.*

***"A square key will tend to rock . . ."***

A square key, as shown in Fig. 2, which is loosely fitted will tend to rock in its keyway when under load. This is due to the fact that half its height is in the shaft and half extends into the keyway of the mating piece. To overcome this condition, the square key must be pressed into the shaft before assembly of the parts commences, as indicated in Fig. 10. The top of the assembled key will determine the minimum diameter of the shoulder on the shaft adjacent to the key. This means that if plain sleeve bearings are used, the shaft with the assembled key will have to pass through the bearing, as shown by the dot and dash line above the key, when the shaft is assembled from left to right.

Usually an over and over or circular cutter is used to cut the keyway in the shaft. If the shoulder is low, a Woodruff key cutter can be used. The larger the cutter and the higher the shoulder, the deeper the cut will be into the shouldred portion of the shaft at *A* in Fig. 10. The depth of cut into the end of the shaft will determine the diameter of the threaded part for the retaining nut, provided of course, the thread is not slotted. If the shaft is long and must be ground, the diameter of this threaded end is too small for a proper size center hole. A small threaded diameter at the end of a shaft is conducive to springing. Another important consideration is that the end of the sleeve bearing should not engage the keyway so that overhang is thereby accentuated.

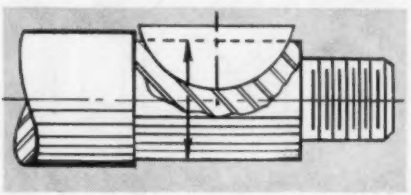


*Fig. 11—This sketch represents a contrasting design to that shown in Fig. 10 wherein Woodruff key is deep seated and, even though fitted loosely, cannot rock appreciably.*

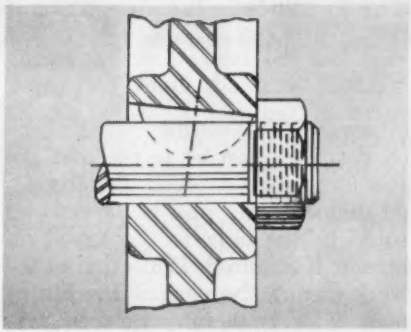


*Fig. 12—This sketch of keyed shaft assembly shows how threaded diameter can be made same as seat diameter of retained piece; it also portrays an assembly construction whereby a shoulder on the shaft is eliminated.*

**The sketch in Fig. 11** represents a contrasting design to that shown in Fig. 10. The Woodruff key is deep seated and, even though fitted loosely, it cannot rock appreciably. The cut is a one-position plunge while the cut in other design requires traverse. Overhang from the sleeve bearing is reduced because there is no cut into the shaft shoulder. The shaft can be assembled through the sleeve bearing without the key in the shaft. The key is finger-pressed in

*"The key chosen is longer than the gear width so that depth of key engagement in the shaft is ample."*

afterward. This means that the keyed diameter can be larger and the shoulder height reduced. The threaded diameter can also be larger and could be the same as the keyed diameter if required. Deflection of the work during the various machining operations is thereby reduced to a considerable extent.

The purpose of the illustration in Fig. 12 is twofold. First, it shows how a threaded diameter can be made the same as the seat diameter of the retained piece. Secondly, it portrays an assembly construction whereby a shoulder on the shaft is eliminated. The keyway is broached in the reamed hole of the pulley, sprocket or gear at an angle as shown. The key will accommodate itself to this particular angle as the nut is tightened.

When a pulley, gear, sprocket or handwheel is mounted adjacent to a ball bearing installation, as indicated in Fig. 13, the shaft diameter next to the ball bearing is usually made only slightly smaller than the bearing hole. If the driving key, such as a square, rectangular or feather key, would have to be pressed into the shaft, disassembly would be difficult without mutilating both the key and the shaft. But with the use of a Woodruff key, even though assembled with a fingerpress fit, disassembly is easily accomplished. The key can be removed by pulling it out with a pair of pliers.

**When the load imposed on a gear** of comparatively narrow width is such as to require a key of suitable height and width, a Woodruff key can be used as shown in Fig. 14. The key chosen is longer than the gear width so that depth of

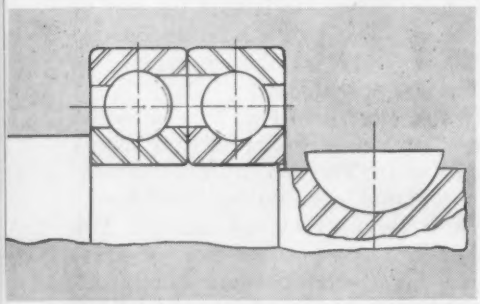


*Fig. 13—When a pulley gear, sprocket or handwheel is mounted adjacent to a ball bearing installation, as indicated in this particular sketch, the shaft diameter next to the ball bearing is usually made only slighly smaller in dimension than the bearing hole.*

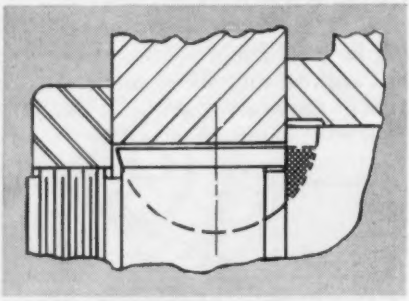


*Fig. 14—When the load imposed on a gear of comparatively narrow width is such as to require a key of suitable height and width, a Woodruff key can be used as shown here. Key chosen is longer than gear width so that depth of key engagement in shaft is ample.*

key engagement in the shaft is ample. The plunge cut is made close to the thread relieved shoulder at the left and into the shoulder at the right. The shaded section of the key adds to the resistance to shear stresses on the key. The bearing above the keyway is relieved of contact so that no cutting action takes place.

Ball bearing catalogs illustrate the use of standardized lock nuts and washers to retain the bearing on the shaft. A typical assembly is shown in Fig. 15. The nuts usually have four slots cut into the periphery. They engage any one of 9 to 19 tangs of the washer, depending on the size of the bearing installation. The cut for the key-like tang in the shaft must be long enough to accommodate this tang without binding. These catalogs specify how far inside the bearing edge the center of the cutter must travel. However, they do not recommend the diameter of cutter to be used. If a large diameter cutter is used, the cut will extend into the bearing seat too far; however, if a small diameter cutter is used a better job results. The writer uses Woodruff key cutters for such cuts. Cutter overhang is no problem even for large bore bearings and shafts because the cut is much shallower than for a key. A traverse cut is necessary.

Occasions arise in machining shafts where a dog cannot be used as a driver. Such shafts, as illustrated in Fig. 16, and also those with tapered ends, as shown in Fig. 8, that have Woodruff key slots near the ends are good examples. A suggested firm of driver has a round key-like protrusion machined on a small dovetail slide that is adjustable lengthwise and suitably clamped by means of a set screw. The shaft is slid under and onto the rounded projection and subsequently on the centers. It is then ready for the machining operation to be performed.

*(To be continued in next month's issue)*

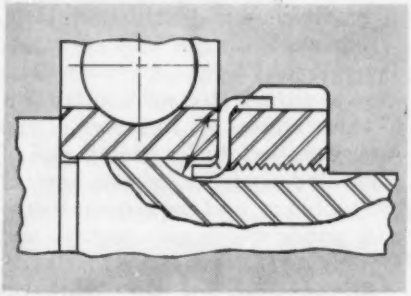


*Fig. 15—Sketch of typical assembly utilizing standardized lock nut and washer to retain bearing on shaft. Nuts of this type usually have four slots cut into periphery which engage any one of 9 to 19 tangs of washer, depending on size of bearing installation.*

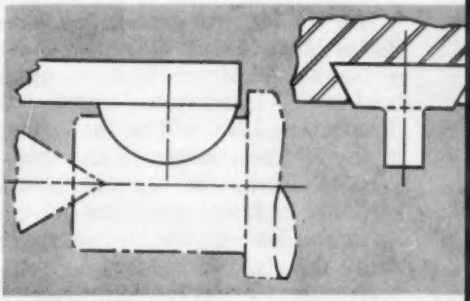


*Fig. 16—On a shaft where a dog cannot be conveniently used as a driver in machining a keyway on the shaft, a driver having round key-like protrusion machined on small dovetail slide adjustable lengthwise and suitably clamped by a set screw can be used.*



## *Cleveland to be host to the "Metal Show" from October 8 through 12.*

**The 1956 edition of the National Metal Exposition and Congress** — "the Metal Show" — to be held in Cleveland from October 8th through the 12th, will be the largest in the 38 year history of the show. Wm. H. Eisenman, General Manager, and national secretary of the American Society for Metals, sponsor of the gigantic industrial assembly, reports an exhibitor roster of 465 companies whose displays will fill every one of the 250,000 square feet available in the city's huge Public Auditorium and Exhibition Hall.

Advance estimates indicate attendance at the Cleveland Show will be close to 46,000. Registration falls into three classes — members of the American Society for Metals and of associated societies, guests invited by exhibitors, and the general industrial public which may register and for only a $1.00 fee, gain admittance.

**All sessions of the National Metal Congress** with its program of more than 150 technical papers will be held in four hotels of the city,

*(Above) View of Public Auditorium and Exhibition Hall, Cleveland, Ohio.*

each a headquarters for one of the four technical societies participating in the Congress. The American Society for Metals will be quartered at the Statler; The American Welding Society at Hotel Cleveland; the Metals Division of the American Institute of Mining, Metallurgical, and Petroleum Engineers in Hotel Carter, and the Society for Non-Destructive Testing will rally in Hotel Hollenden. Two other societies, The Special Libraries Association, Metals Division, and the Industrial Heating Equipment Association are holding sessions concurrent with the Congress.

# 38th National Metal Congress and Exposition

Hours of the show on the first three days will be from 12:00 noon to 10:30 P.M. and on the last two days from 10:00 A.M. to 6:00 P.M. On Saturday, October 6 and Sunday, October 7, the American Society for Metals will hold its pre-Metal Show Seminar in Hotel Statler on "Creep and Recovery." A total of 13 papers will be presented. Coming specially to the United States to appear Saturday evening at 8:00 P.M. (October 6) is Dr. E. N. da C. Andrade, former director of the Davy-Faraday Laboratory and Honorary Librarian of the Royal Society, London, England.

**Among the technical sessions having more than ordinary scientific significance** will be a one-day conference on Thorium Metal October 11, jointly sponsored by the Atomic Energy Commission and the American Society for Metals. It will be chaired by four leading scientists: Drs. F. H. Spedding and H. A. Wilhelm, Director and Assistant respectively of The Institute of Atomic Research, Ames Laboratory, Ames, Iowa, and Mr. E. Epremian, Chief, Metallurgical Branch, Division of Research and R. Carson Dalzell, Assistant Director, Engineering Development Branch, both of the U. S. Atomic Energy Commission of Washington. The conference is to present 22 talks by top atomic-nuclear experts. It is one of the first conferences of its kind held.

Departing from past procedure, the Metal Society is sponsoring a special forum on Die Life and Die Wear, a day's program limited to 200. From this "participating" forum is hoped will come much data helpful to the Stamping industry.

The annual Metallographic Ex-

***Metal Show . . .***

hibit of the A.S.M. will be held the week of the Show. The exhibit, new for 1956, will move across the country following the Metal Show on a tour of Metal Society Chapters and technical universities.

**The annual meeting of the American Society for Metals** will be held Wednesday morning, October 10 in Hotel Statler and the annual dinner will follow October 11 at the same hotel. Winner of the Albert Sauveur Achievement Award presented by the Metal Society for distinguished accomplishments in the field of metallurgy will receive the engraved plaque during the banquet. Dr. Charles S. Barrett, professor at the University of Chicago, Institute of Metals Study, will deliver Campbell Memorial Lecture.

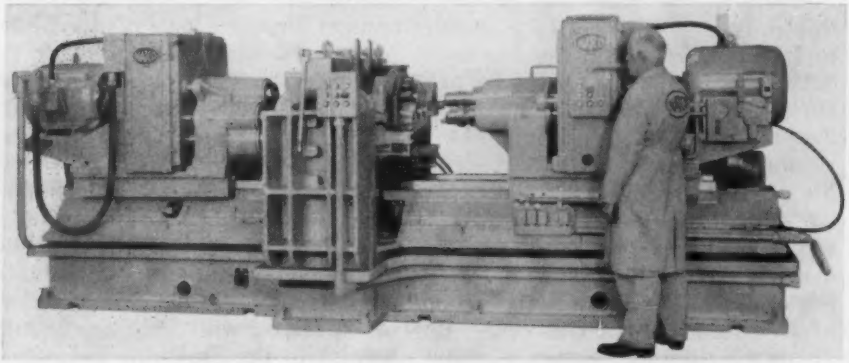
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**Close tolerance parts, once thought impractical** for high production machines, are now being machined automatically by National Automatic Tool Co., Inc., Richmond, Ind. For example, The Frank G. Hough Co., Libertyville, Ill., specified 0.0005 inch tolerance on the idler bore diameter for their Payloader transmission housings. The bore had to be square with the mounting face within 0.0005 inch per inch bore length. Hough had been performing the job on a standard boring mill but were unable to maintain the production rate required.

Natco supplied a two-way automatic boring machine that holds tolerances and produces at the required rate up to 35 parts per hour. This machine employs hydraulic feed and has a fixture designed to hold five different transmission housings. In addition to close-tolerance boring, the machine also chamfers, counterbores and notches boss contours.

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*Natco Horizontal Boring Machine used by Frank G. Hough Company for transmission covers.*

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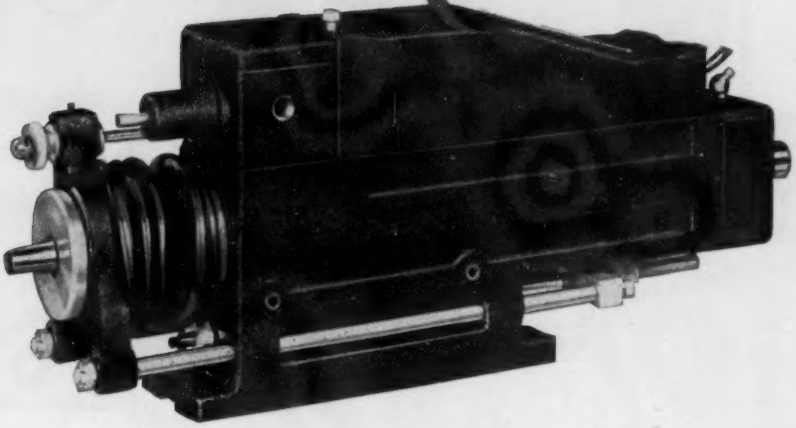
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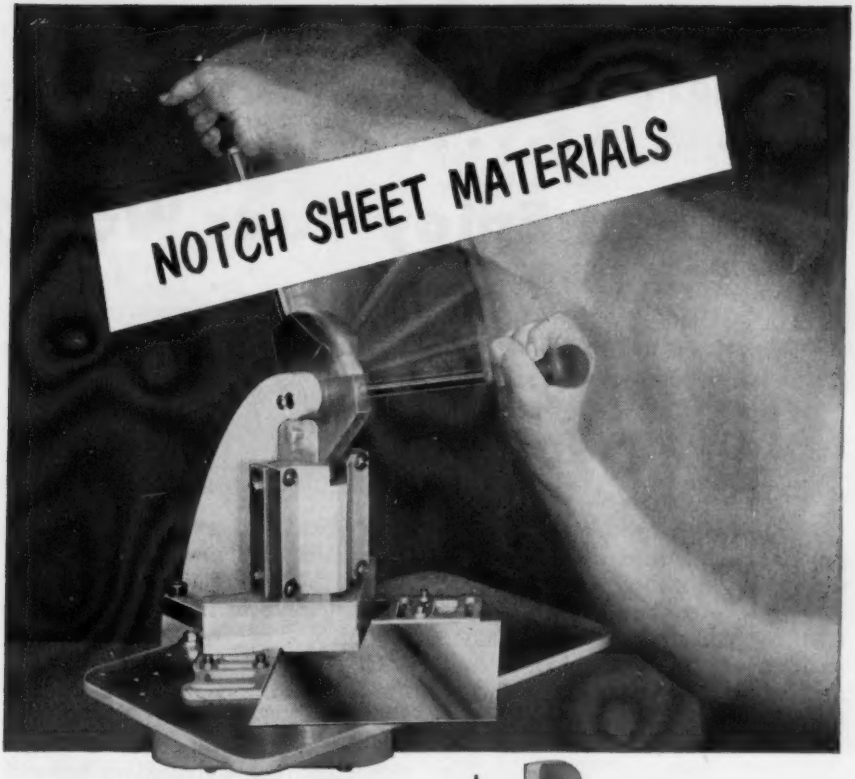
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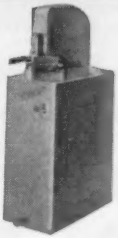

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***MR. INDUSTRIAL EXECUTIVE, IF YOU ARE NOT FINDING ENJOYMENT IN YOUR JOB, READ THIS—***

# Why Not Enjoy Your Work?

**10** ***factors why the industrial executive or supervisor may not be getting the fullest enjoyment from his work are discussed.***

By ALFRED M. COOPER

**The industrial executive or supervisor who does not find genuine enjoyment** in his job probably is working too hard. At best this head man must always work under stress; every irritating factor in connection with his job adds a bit more to this strain. Every consideration of physical and mental health and the chances of living out a long and useful life make it imperative for the executive to find enjoyment in his job.




*"He must dictate the level of his emotions . . . not allow the job to dictate them . . ."*

Dr. John A. Schindler, author of the best-selling book, "How to *Live* 365 Days a Year," gives the psychiatrist's viewpoint as follows: "Great responsibilities, the constant demand for great effort, and the fight to maintain his gains are common stresses of the top executive. The competitive fight for advancement, with its overshadowing security, is the lot of the man on the way up . . .

"For the individual who is caught in his job, the only answer is to sneak enjoyment in through the back door, to make himself as cheerful as possible, and to be upset by the irritations of the job as little as possible. *He himself must dictate the level of his emotions and not allow the job to dictate them for him.*"

Executives and supervisors are forever watchful of the health of




*". . . average life-expectancy among executives is an unbelievable low of 54 years."*

those reporting to them. But they are inclined to be careless of their own health.

It is also true that many of us believe that work was never meant to be wholly enjoyable; that therefore it is a waste of time to attempt to make it so. But whenever we read the biography of a great industrialist, almost invariably we find it emphasized that this man worked hard *and enjoyed every minute of it.* And as a rule it also develops that these outstanding men lived and worked to a good ripe age.

In addition to improved health and longer life, work enjoyment makes it possible for the supervisor or executive to do better work with less effort. When the aggravating factors have been eliminated the executive can expend all energy usefully, instead of wasting half of it overcoming irritating conditions that need never exist.

In discussing this matter of job enjoyment with many types of executives I find that most of them say they would enjoy their work thoroughly if . . . . And almost always this "if" has to do with just one or two phases or activities connected with their jobs.

Most executives are on top of their jobs *and except for one or two phases of it* enjoy their work. Studying a number of such cases it becomes evident that the following factors may well be among those causing trouble, and should be carefully checked by the executive who would like to thoroughly enjoy his job—all of it.

### *1. How is your health?*

When it comes to job enjoyment, health appears to be a two-way street. That is, if your health is bad, you can't enjoy your work, and if you don't enjoy your work, almost certainly your health will be affected in some way.

As of now, men of 60 constitute




*"A good second man can take a lot of the load off the shoulders of the executive . . ."*

***". . . average life expectancy among executives is 54 years."***

the only group of Americans whose life expectancy is the same as it was in Civil War times. This in spite of all the marvelous advances in medicine. Henry Ford said that an executive was just beginning to become really valuable at 50; that it took that long to learn to be a good executive. *But the medical director of a large corporation tells me that the average life-expectancy among the senior executives in his corporation is an unbelievable low of 54 years.*

Obviously there is something seriously wrong here. Executives certainly are not expendable, and it would appear that a twice-a-year physical check-up is not enough to protect these irreplacable men. That same medical director told me that worry was the great killer among executives. Thereafter he listed overweight and overeating, faulty exercise habits, and excessive drinking and smoking as contributing factors.




*". . . supervisor getting little enjoyment should examine relationship with his superior."*

In this discussion of job enjoyment there will be no haranguing on methods of retaining or regaining health. Each of us knows just about what our constitution requires if we are to remain in good health. It is all a question of whether the desire to be healthy is stronger than the desire to indulge in unhealthful living.

When job enjoyment becomes recognized as not only desirable but altogether feasible of attainment, then we will seriously study the factors entering into the health of the mature individual, and thereafter most of us will feel better and live longer.

***2. Have you the right second man?***

An executive or supervisor who has a good chief assistant has an excellent chance to enjoy his work. This second man must not only be intelligent, loyal, and a hard worker, but he must be exactly the type of individual who can best work with the particular executive he has for a boss. A *good second man can take a lot of the load off the shoulders of the executive to whom he reports.* He can, by a display of willingness and initiative, assume and discharge responsibilities that must otherwise add to the physical and mental drain on the executive's energies.

If it should happen that an executive has a second man who is not quite the man for the job, right here may be found the factor that makes job enjoyment, for that head man, an utter impossibility.

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***". . . boss and second man must work well together."***

and the assistant is unique. Here is found the best training school in leadership within industry. The two, boss and second man, must work well together, must hold the same views on important matters pertaining to the work of the department or division, and there must also exist mutual liking and respect.

It sometimes happens that a second man will be chosen as carefully as possible, yet later on it develops that this assistant is simply not the right man for the job. Perhaps as he is given more and more authority he proves incapable of accepting the responsibilities that must go with authority. Or any of a number of other unpleasant and unexpected traits may show up as time goes on.

Executives often hesitate to change second men, even after they have become convinced they have made a mistake in selecting an assistant. Perhaps they do not like to demote this man and thus put a blot on his employment record. Or they may feel another assistant might not prove enough better to justify the change.

Nevertheless, if there is friction between boss and assistant, it is unlikely that either can continue for long to enjoy his work. If the executive or supervisor really wishes to enjoy his job he should make every effort to secure the right sort of second man.

Perhaps the present assistant can be given further training, or his work habits and attitude may be corrected, once he appreciates an emergency exists. Or it may be that surgery is indicated. In any case, whatever action is taken must emanate with the boss. And action of some sort certainly should be taken.

### *3. Do you get along well with your superiors?*

As a rule an executive or supervisor cannot choose his superiors. Usually it works the other way around. Nevertheless, he has a lot to say about what his relationship is to be with these higher-ups, and he knows this must be good or he has little chance to enjoy his job.

Even though every factor of self-interest would appear to favor exceptional effort to get along with superiors, it is true that many good supervisors find this their most difficult relationship. Supervisors, in particular, sometimes have a problem here. It is not uncommon to encounter a supervisor who is outspok-




***"If he appears busy, with people running to him for O.K.'s, . . . he's doing too much."***

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***"He can improve cooperation without apple-polishing."***




*". . . assistant cannot retain respect of subordinates who deal directly with big boss."*

en in his criticism of his superior. He may even speak slightingly of his boss to his own subordinates—a foolish thing to do, since this cannot increase the respect of these people for either the supervisor or the superior, and this sort of thing has a way of getting back to the boss. This is not the way to improve matters.

*If a supervisor finds he is getting too little enjoyment from his job he should carefully examine his relationship with his immediate superior.* Perhaps he can improve his cooperation without being guilty of apple-polishing. Perhaps, by studying the boss he can come to appreciate better some of the superior's problems, and thereafter take action to help in solving these.

In any event, it should be obvious that the supervisor can't win in a fight with his boss, and he has quite a bit to lose. If he wants to enjoy his work he'd better take any steps indicated to improve this relationship.

### *4. Can you delegate authority to others?*

Even today, too many executives and supervisors refuse to delegate very much authority to subordinates. They would have no objection to passing on work to others, but at some time they have had unpleasant experiences in which they have learned they can delegate authority, but the responsibility for the acts of subordinates continues to rest on the shoulders of the superior.

Yet unless authority is delegated, neither the supervisor nor the executive can hope to attain job enjoyment. There is simply too much detail nowadays to any supervisory or administrative job to make it possible for one man to handle everything.

The smart boss begins early to

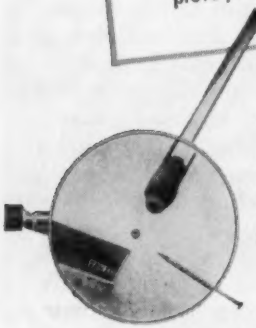



*". . . most difficult type of cooperation is that between supervisors of equal rank."*

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***"The short-circuited assistant cannot retain respect."***

study his subordinates and determine which among these are so constituted that they can be trusted with authority. To these he will delegate, at first, a little and then later, as they prove they can be relied on, more and more authority.

In this manner, and only thus, can the head man avoid being swamped with detail. Once he passes along this mass of relatively minor activity to others he frees his hands for more important administrative work.

When you visit the office of a supervisor or executive you at once become aware of his views on the subject of delegation. *If he appears terribly busy, with people running to him for O.K.s on everything, the chances are he's trying to do too much.*

But if the head man appears to be relaxed, and there are few interruptions during your visit, you know he must have trusted lieutenants somewhere on the job who are empowered to make decisions without consulting him. It is not difficult to decide which executive has the better chance to enjoy his job.




***"The supervisor who cannot reprimand properly is also making trouble for himself."***

### *5. Do you short-circuit subordinates?*

Surprisingly often you encounter an executive who will short-circuit an assistant and give orders regularly direct to employees who are supposed to report to that assistant. No practice can create confusion more surely in any organization than short-circuiting. In many instances this condition is an outgrowth of refusal to delegate.

When the head man by-passes his assistants and thus nullifies their authority he makes it impossible for them to function properly. *The short-circuited assistant cannot retain the respect of subordinates who can deal directly with the big boss without consulting their immediate superior.*

The head man who practices short-circuiting is going to have a dissatisfied group of subordinate supervisors and this is going to affect adversely the morale and efficiency of the entire department or division. Most executives take a dim view of short-circuiting, but many stipulate there must be nothing to make it impossible for any employee to come directly to them with a grievance.

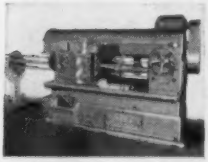
Short-circuiting by the boss should be held to a minimum. Anything that disrupts departmental morale is




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***"Cooperation begins at the top and works downward."***

going to make it that much harder for the head man to enjoy his job.

### *6. How well do you cooperate?*

If cooperation may be defined as the lubricant that keeps everything running smoothly in any industrial organization then certainly the executive's job enjoyment must depend in large measure on his ability to cooperate and to win cooperation from others.

Cooperation in most organizations appears to begin at the top and work downward. If executives do not cooperate well with one another, with management, or with their subordinate supervisors, then there may exist but little teamwork between the employees.

*Supervisors always agree that the most difficult type of cooperation from their standpoint is that between supervisors of equal rank.* This is probably true, since these men may well be in competition for the job ahead, and it is sometimes difficult to see why one should go out of his way to help a competitor.

Yet nothing will convert any plant into a madhouse quicker than for brother-supervisors to refuse to cooperate with one another and with their own subordinates. It is a fact that in many organizations cooperation continues to rate very low.

The executive who can cooperate with other executives, with his subordinates, and with management, and who also has the knack of winning cooperation from others, has an excellent chance of enjoying his work. Certainly he is going to have a lot of well-wishers, and that always helps to smooth the way.

In an organization in which cooperation rates close to zero (and there are such) it is difficult to see how anyone can enjoy his job.

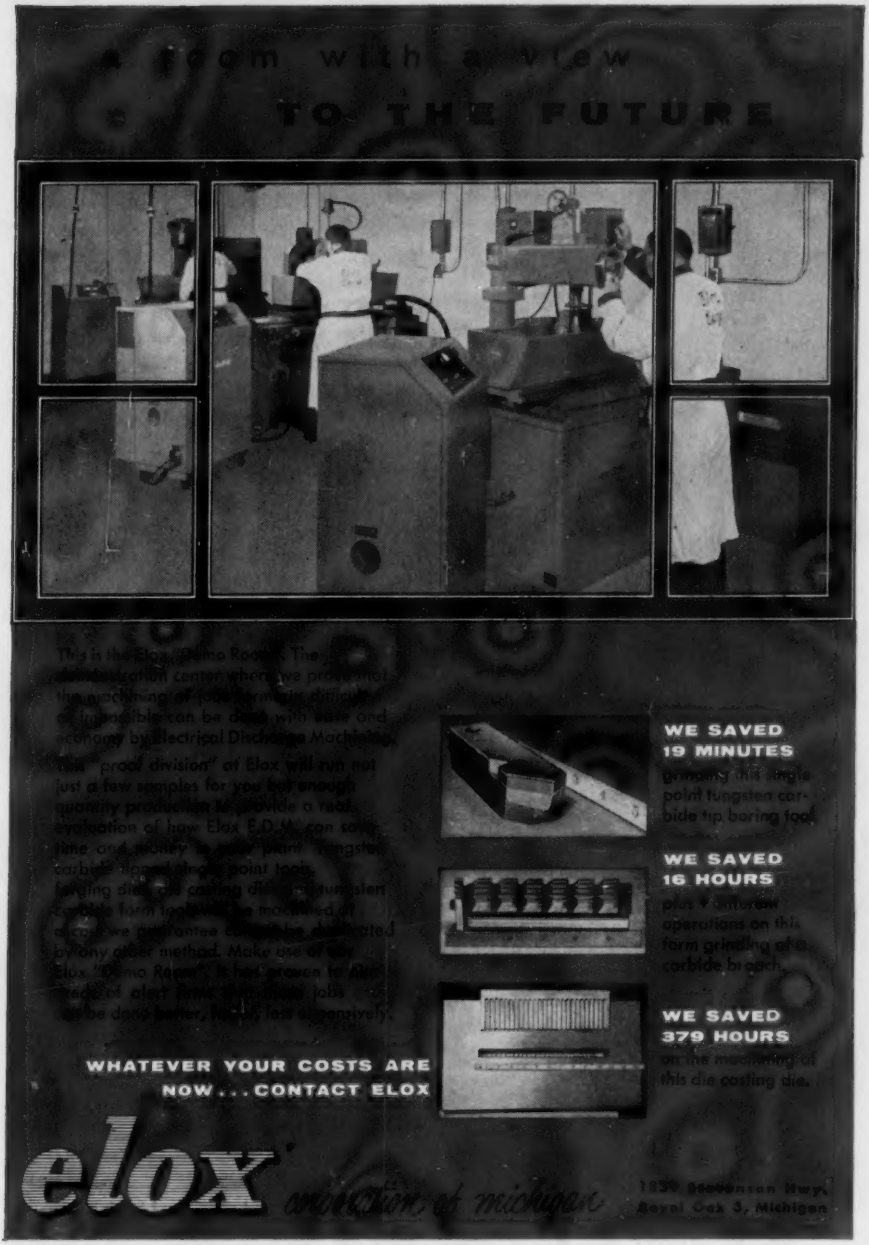
### *7. Can you reprimand without leaving rancor hangover?*

A thousand years hence it may be possible to run a department or division without ever finding it necessary to deliver an occasional reprimand to employees. In the meantime, however, the head man who wishes to get enjoyment out of his work had better be sure he can forcefully point out subordinates' errors in such fashion that these will not be repeated.

Most supervisors agree that all reprimanding should be done in private, that the employee must be




***"Any industrial executive must undergo stress . . . some never let down and crack-up."***

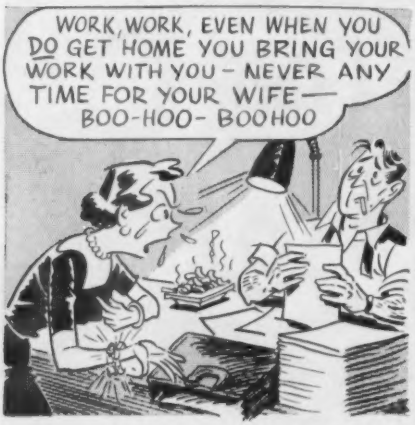



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***"If taken care of properly, reprimanding can be effective."***

made to understand exactly why he is being reprimanded, and not permitted to leave with the feeling that he has just been bawled out for no good reason. Thereafter, it is important that the incident be closed in such fashion that there can be no possibility of a carryover of rancor on either side. If this is taken care of properly reprimanding can be wholly effective, yet not create friction afterward that will make for continued unpleasantness on the job.

The supervisor who neglects to reprimand when such correction is called for is evading an important part of his job. *The supervisor who cannot reprimand properly also is making trouble for himself.* Neither the employee or supervisor has a very good chance of enjoying his job.




*". . . it is true that an unhappy home life can take all pleasure out of the job."*

### *8. Can you consciously relax?*

Many books have been written in recent years on the subject of deliberate relaxation as a method of relieving the tensions that build up on the job. The supervisor or executive who finds himself too tightly wound up, inclined to become too tense and irritable, may need to practice conscious and deliberate relaxation. In general, this may be true of the more mature head man who finds the strain of long-continued effort becoming increasingly onerous.

*Any industrial executive of today must undergo stress, both mental and physical. Some never appear to learn to let down and eventually crack-up.* Apparently psychiatrists have been giving much thought to the alarming statistics of breakdown in the health of the modern industrial executive.

All executives encounter such stresses, but some of these have somewhere, somehow, learned to relax on the job. These certainly are the ones who have the best chance to enjoy their work and to avoid crack-up.

### *9. Are you working too hard?*

Years ago, somebody said that no one ever works himself to death. That may have been true in those more relaxed times, but it probably doesn't apply today, and particularly in the case of industrial executives. I know a number of these who consistently work 12-hour days, and who carry their load of responsibility with them for 24 hours of each day.

Undoubtedly this is a killing schedule, and certain it is that no one can possibly enjoy a job that de-

mands so much of his time and effort. Neither will this executive have the time nor energy to enjoy his home life or any form of recreation. *And it is also true that an unhappy home life can take all the pleasure out of the job.*

Delegation of work and training lieutenants to take their full share of the load will make it possible for the executive to materially reduce his working hours. So also will attention paid to the other factors we have been discussing. Anything that tends to make the job more enjoyable must lighten the work load and make it possible to shorten the work day.

### *10. Have you a suitable, interesting hobby?*

Increasingly, the modern industrial executive finds it imperative to indulge in an interesting avocation as a means of forgetting for a time the stresses of the job. For too many years such recreation appeared limited to golf or collecting something, and of course these are interesting and rewarding pastimes. But in recent years busy executives appear to be using more imagination in choosing hobbies. The do-it-yourself trend in after-hour activity may well interest the executive who was once expert at handicraft.

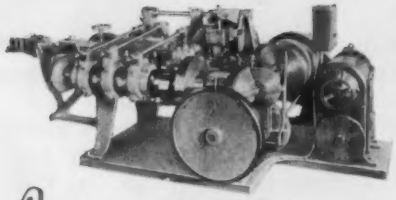
*But the only limiting factor in this connection should be that the avocation is truly absorbing.* Nor does it need to be so different from that of the executive's vocation. I once knew a steam engineer who had a wonderful time in his off hours building miniature steam engines. Any manual effort is almost certain to be rewarding to the executive who has no opportunity for doing things with his hands on the job.

I have known a few outstanding exceptions to the rule that busy executives need hobbies. In these cases the industrialists so thoroughly enjoyed their work that they preferred it to doing anything else. They were simply unhappy when not engaged in building automobiles or creating utility empires, and apparently they felt no need for anything different as a hobby.

Somewhere among the foregoing ten factors may be found the one or two elements of the job of the supervisor or executive that make it impossible for him at present to enjoy his work. Rarely will the executive have difficulty with more than two of these activities, but with different executives of course the two may well be not the same pair. Even one such activity, improperly handled, may serve to make it difficult for the executive to fully enjoy his work.



*". . . the only limiting factor should be that the avocation is truly absorbing."*

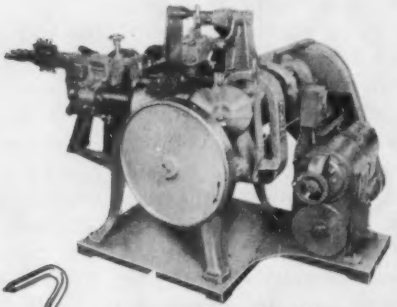




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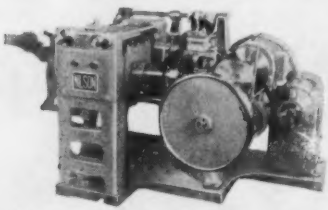
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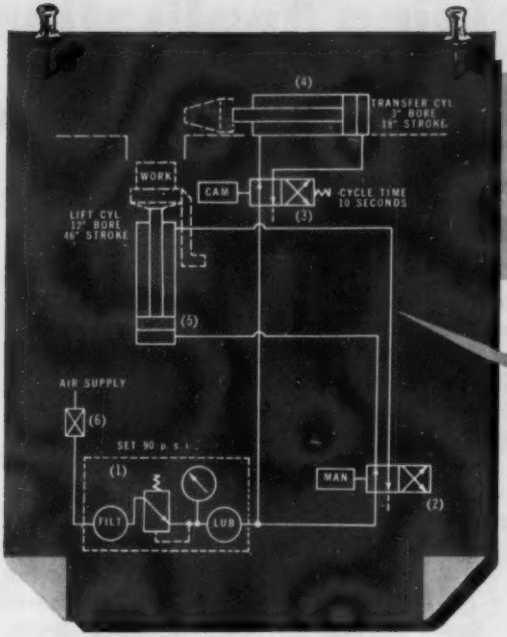


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# Unusual Welding Applications

## Agricultural Equipment

By C. V. GORECKI
Superintendent of Assemblies,
Massey-Harris-Ferguson, Inc.,
Batavia, New York

**Many arc welded assemblies produced** in the Batavia, New York, plant of Massey-Harris-Ferguson, Inc., are employed as components of several types of agricultural machines. Welding of most such assemblies is done by routine methods, but certain jobs involve noteworthy features.

All of these welded components are for the Massey-Harris Clipper "50" combine, and the most unusual job is performed in a special positioner or welding machine, as illustrated in Fig. 1. This machine is employed to weld shallow cups into the ends of tubes of about 2 inches in diameter. When completely assembled and welded, they become drive rolls for wide canvas belts or aprons, whose function is to carry grain that falls from the cutter bar into the rasp bar cylinder, where the grain is separated from straw and chaff or husks.

At each end of the tube, it is necessary to insert and support a short shaft on which the drive roll turns in a bearing. As the shaft is much smaller than the tube, with which it must be coaxial, spacers have to be applied and permanently fastened to the tube. Formerly, the spacers nearest the outer ends of the tube were



*Fig. 1—Using a carbon electrode, supported in a fixed position, to weld a drawn cup to the end of a tube that the operator turns by hand as he watches the weld through a dark glass. Welding fuses the edge of the cup to the end of the tube.*

***Carbon arc is used to fuse drawn cups into ends of tubes. Plug welds fasten channels to the concave side of special combine grate.***

flat steel washers, whose holes were a press fit over the shaft and whose o.d. fitted the tube bore. When put in place, the outer face of each washer was about ¼ inch from the square end of the tube.

Subsequently, a circular fillet arc weld was made to fasten the washer to the tube. It proved difficult, however, to avoid greater eccentricity than is permitted in specifications, and welding was rather slow—only 200 to 250 rolls per 8-hour shift. To increase this output and also to hold required eccentricity limits, it was decided to substitute a shallow drawn cup for the flat washer, the cup having a similar central hole.

When this cup is pressed into the end of the tube, the edge of its narrow cylindrical portion comes flush with the square end of the tube. This brings the flat portion of the cup to the same location as for the flat washer used before, but better centering results. It remains to make a weld that will join the end of the tube to the flush edge of the cup. This could be done with an ordinary coated rod, but, as no filler metal was needed, it was decided to fuse the two flush portions by using a bare carbon arc.

To do this expeditiously, the positioner or rotator shown in Fig. 1 was devised. After cups on shafts are pressed into place in the tube, the assembly is set vertically, as shown, the lower end resting in a conical cup in which the shaft is centered. This cup turns about a vertical axis when the tube is turned. Rollers above the center of the tube are so placed that the tube is supported vertically and is easily rotated about its own axis by hand. Rotation is applied, however, only when the operator steps on a pedal. This raises the tube into contact with a vertical electrode above the tube, striking the arc. Then the tube is lowered slightly to produce an arc of desired length.

This carbon electrode, supported in a holder, is set in a fixed position. Welding current is supplied by a Lincoln Electric d.c. welder. As soon as the arc is struck, the operator, observing the arc through a welding lens, starts to turn the tube by hand and keeps it rotating at a uniform speed, such as to fuse the edge of the cup to the tube during one full revolution. As the carbon burns away only very slowly, the tube is kept at constant height until the weld is completed. Next, the operator releases the pedal, lowering the tube and breaking the arc. Then, he unloads the tube, shifts it end for end and makes a duplicate weld at the opposite end.

**Excellent welds result** and the operator completes welding on 650

***"Welding cost per piece is less than one-third of the former cost . . ."***

rolls per 8-hour shift, or at about thrice the rate formerly attained. Welding cost per piece is less than one-third of the former cost, quickly amortizing the simple machine built for this job. When the electrode slowly burns too short, it is lowered in the holder and is easily replaced at slight cost when too short for further use. As no coating is used, no smoke results. Welds, however, are uniform and of good grade. They meet all service requirements, and the use of a cup tends to avoid eccentricity beyond the close limits specified.

A feature of Massey-Harris combines is the use of cylinders, (Fig. 2), having a series of six rasp bars whose teeth are set at an angle. These, in combination with a concave grate, exert a rubbing action that effects the required separation of the grain. Both the cylinder and the grate are weldments having unusual features.

Rasp bars are of high carbon steel and each bar is fastened to a low carbon steel backing, having a hat-shaped section. This fastening is done by a series of short fillet welds along each edge of each bar, as Fig. 2 indicates. Despite the differences in composition of the rasp bars and the backing, welds are made readily by using an E-6012 electrode of ¼-inch

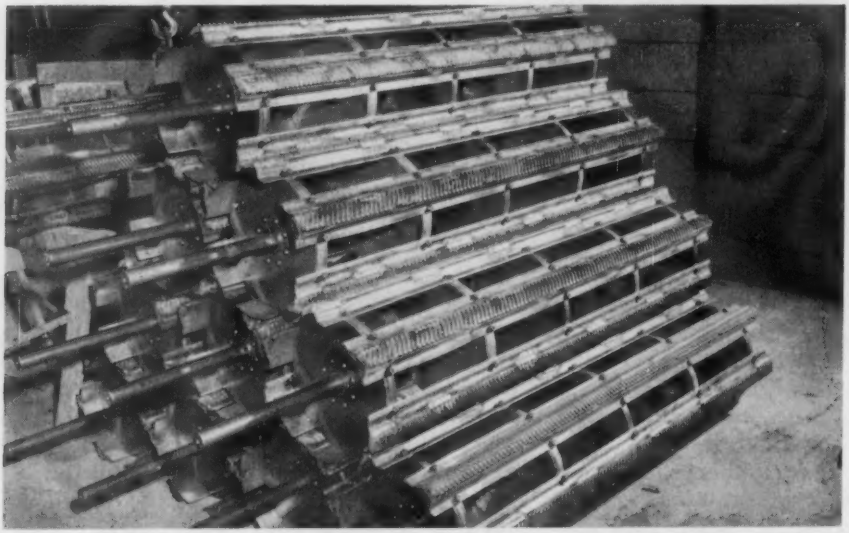


*Fig. 2—Rasp bars of high carbon steel are fastened to low carbon steel backing plates of hat section by short fillet welds. Six assemblies are then bolted to each cylinder.*

size, the welding being performed by hand.

**Grates of concave form are made** from low carbon steel plate, each having pierced therein four rows of elongated holes. After piercing, the plates are rolled to a circular arc. Fastened to the inside of the plate are five narrow, short-legged channels that appear clearly in Fig. 3, three of these channels being between rows of holes and one each outside the outer rows of holes. Between the legs of one outer channel, five nuts are fastened concentric with a hole that registers with a larger hole through the grate. Each of the other four channels covers a set of five holes through the grate.

Assembly of the grate is done in a fixture having a curved surface to mate with the inner face of the grate. In this surface are five slots in which the five channels are placed, legs down, before the grate is fastened above the channels in the fixture. With the parts held in this position, a weldor, using a LH-70 low hydrogen electrode, makes a plug weld in each of the 25 holes. These welds fasten each channel at five points to the grate.

**Such welds provide a secure fastening** for the channels, five of the welds being adjacent to the five nuts which, after retapping, receive studs for fastening the assembly (removable), so that the channel legs lie close and parallel to, but not touching, the cylinder rasps. In threshing, the grain, still on the straw, passes between the rasp bars and channel legs. Grain is scrubbed free of husks and straw and falls through grate holes for collection.

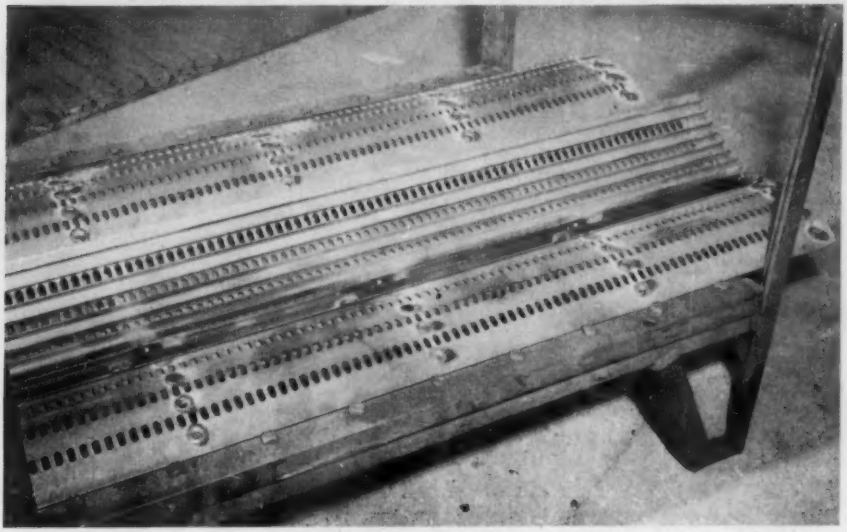


*Fig. 3—Curved grates have rows of holes, alongside of which narrow channels are fastened, each by five plug welds through holes in grate, using a low hydrogen electrode.*

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# Modernize Your Shop

***Tax savings, increased production and reduced maintenance expenses are direct benefits of new equipment installations.***

By JACK BEDFORD

**Modernization is a must** . . . a competitive must to keep your machine shop up-to-date and your production and profits up to a high level. New lighting, new buildings, new fixtures and new equipment all add to the value of your machine shop. And, as we all know, improvements cost money. The return of this investment will not be immediate but will more than repay itself in increased business and lower costs of operation. Now there is an extra profit-builder involved which is highly important to the machine shop owner; namely, income tax savings.



*"With new equipment you save on taxes."*

To enjoy all of these benefits of a new, modern machine shop, there is a fundamental rule involved: *Buy new equipment.* Modernizing your machine shop with second-hand equipment may seem to give you a saving at first glance. But, before you complete the deal for used equipment for your business, you should consider the tax problems which you will have.

## Tax Savings on New Machine Shop Equipment

Let's assume that you can buy a new drill press for $3,000 for your machine shop which will handle the production work you want. Or, you can buy a similar model that is used for $1,500 that is three years old and will give you a drill press for your machine shop. At first glance this seems to provide a saving of $1,500 for you. However, there is a feature of the income tax law that may provide you more savings over the first few years with the purchase of a new drill press.

Assume that the estimated life of the drill press is set at 5 years (you can set this estimated life as you feel it will apply to your machine shop

# and Save Money!

and to your equipment). With the double-declining balance depreciation method, you would figure your depreciation (an income tax deduction) like this:

| | |
|---|---|
| 1st year | $1,200 |
| 2nd year | $ 720 |
| 3rd year | $ 432 |
| | $2,352 |

Thus, in the first three years you will have taken tax deductions of $2,352 on a new drill press that had an initial cost of $3,000. The $2,352 is a direct deduction on your income tax for these years which will represent a saving for you in the operation of your machine shop.

On the other hand, if you purchase a used drill press for $1,500, you will be permitted to take these deductions during the first three years you own it:

| | |
|---|---|
| 1st year | $300 |
| 2nd year | $300 |
| 3rd year | $300 |
| | $900 |

This used drill press will have a book value of $600 at the end of three years. You will have deducted only $900 as an expense of doing business. Naturally, the drill press will be three years older and have less resale or trade-in value than the drill press purchased new that is only three years old.

For comparison, consider these figures for the two purchases of machine shop equipment:

| | New | Used |
|---|---|---|
| Initial Cost | $3,000 | $1,500 |
| Depreciation for 3 years (tax deduction) | $2,352 | $ 900 |
| Book value at end of the 3 years | $ 648 | $ 600 |

At the end of three years in this example, your book value of the new and used machine shop equipment is only $48 apart. Naturally, the drill press which was purchased new will more nearly be worth its valuation of $648 than the used equipment that is three years older. In the three-year time span, you will have taken only $900 in tax deductions on the used equipment and




*"Used equipment has higher repair expense."*

*"New machine shop equipment has another advantage that cannot be measured—business building."*

$2,352 in deductions on the equipment you purchased as new.

### Repair Savings

Another saving you will have when you buy new machine shop equipment for your business is in repairs. This is harder to estimate, but it is obvious that new equipment will not require as much repair expense during the early years of its life as used equipment during the same time span.

Assume, for illustrative purposes, that your annual repair bill on the new drill press is as follows:

| | |
|---|---|
| 1st year | $100 |
| 2nd year | $100 |
| 3rd year | $200 |
| | $400 |

Used equipment will have a higher repair expense. On the assumption that it is three years old when purchased as used, the repair charges for the first three years of ownership might be as follows:

| | |
|---|---|
| 1st year | $200 |
| 2nd year | $300 |
| 3rd year | $300 |
| | $800 |

This amounts to a difference of $400 for the first three years or twice as much repair expense for the used equipment as for the new. These figures are estimates, but a review of your books on any equipment used in your machine shop will give you figures to serve as guides in estimating your firm's repair expense.



*"New shop equipment is profit builder."*

### Profit Builder

New machine shop equipment has another advantage that cannot be measured in dollars and cents as easily as the tax and repair savings. This is the business building, labor savings, and production increasing advantages. There is also a certain advertising value that goes along with modernization that you can cash in on in the management of your machine shop.

Anything that saves labor builds profits for your machine shop. New equipment that has all of the modern labor saving devices will save labor for you and for your employees. This can be used for more productive activities which will help you build bigger profits for your business.

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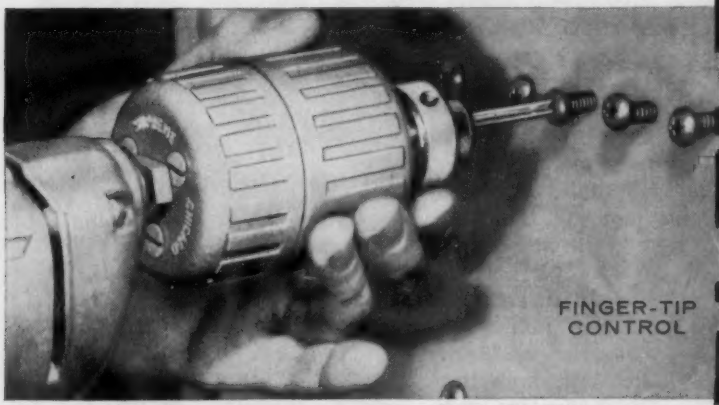
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***"You can apply this technique to the purchase of new or used equipment . . ."***

Before you decide to buy used equipment consider all the angles. Figure the tax deductions you will have with both the new and the used equipment . . . determine the repair expenses you will have with both new and used equipment . . . and consider the labor saving and business building aspects of both new equipment and used equipment.

Modern machine shop management gathers the facts, compares the data available, and then makes a decision that will have a bearing on the future profits and operation of the business. You can apply this same technique to the purchase of new or used equipment for modernization of your machine shop through the plan outlined in this particular article.

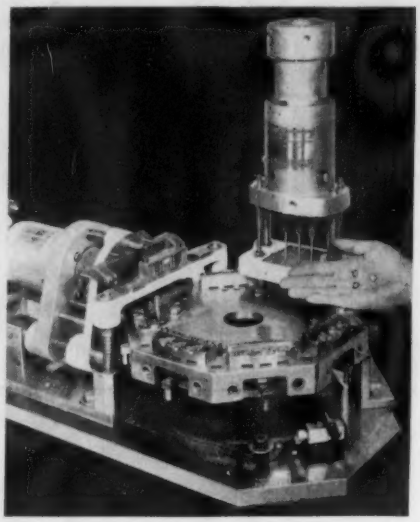
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## Unique Setup for Small-Hole Drilling

**The accompanying illustration shows an interesting setup** devised by Zagar, Inc., for drilling holes in a detent for a navy fuse, the part being roughly the size of a fingernail. The setup comprises a special eight-station rotary indexing table used in conjunction with two standard gearless multiple-spindle drill heads, one head being mounted vertically to ream two holes and the other head being mounted horizontally to drill a hole in the side of the detent.

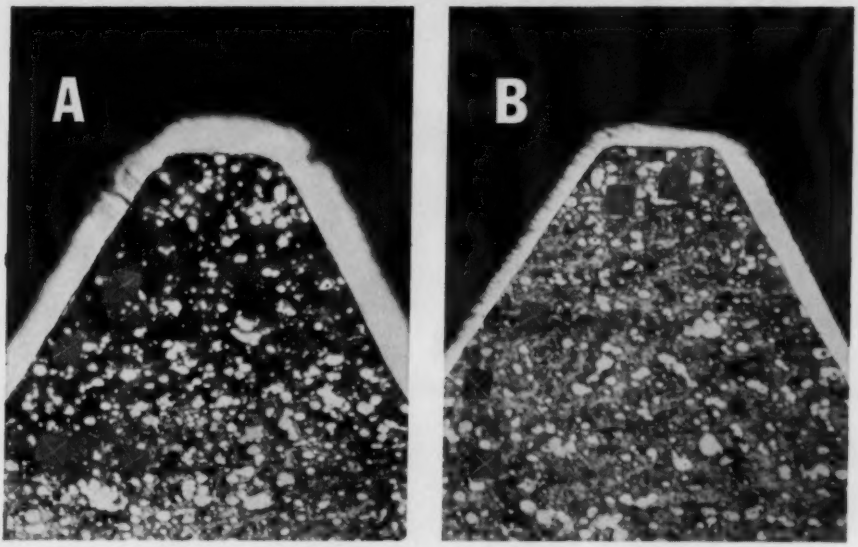
Three pieces are held in each of eight stations, and the holes are drilled simultaneously in three pieces. The two holes through the part are on 5/16-inch centers and are 1/16 inch and 3/32 inch in diameter. The side hole, a No. 55 (0.052-inch) diameter drill through a 1/16-inch section, is drilled from another station at the same time. Six stations are always open for loading, cleaning and unloading. Loading is manual. Progressive indexing and ejection are automatic. Production with this setup is rated at 1200 pieces per hour.

For more data circle **2** on Reader Service Card



***Unique setup devised for drilling and reaming holes in detents (shown in palm of hand).***

# WHICH OF THESE TAP SURFACES WAS REJECTED BY HY-PRO'S MICRO-HARDNESS TESTER?




## The flaws in Tap A were revealed by Hy-Pro's Micro-Hardness Tester—part of Hy-Pro's exclusive 3-way Quality Control!*

THE machines that grind a tap surface can generate a great amount of heat. Without Hy-Pro's control, this heat can burn and soften the tap, weakening it to a serious extent.

Such weakening is invisible to the naked eye. But Hy-Pro's Micro-Hardness Tester reveals the extent of the flaw every time! What does this mean to you? Productivity per tap has been increased by 20 to 25 times through the selective work of Hy-Pro's Micro-Hardness Tester. And that means time and money saved on your production line.

The Micro-Hardness Tester is an important part of Hy-Pro's exclusive 3-way Quality Control, which guarantees you the finest taps in the world. All Hy-Pro tap cutting edges are checked down to half a thousandth of an inch.

If you would be interested in taps by Hy-Pro—the Tap Specialists—see your nearest Hy-Pro distributor or call us direct. Believe it or not, Hy-Pro Taps cost no more than ordinary taps.



** The small dark squares are diamond impressions used in testing the structural strength.*

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HY-PRO

*"The Tap Specialists"*

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To get clean wipers at the tool crib, this lathe operator must leave his machine, make the hike, then stand in line. He makes the trip at least once a day, takes several minutes to do it.

# He has to waste 60 minutes a week




Easy to distribute . . .
always a clean one handy



They really soak up oil . . .
good for solvents, too



When thoroughly used . . .
toss 'em in the trash




With a carton of 125 clean Scott Wipers at every workbench, daily wiper replacement is often unnecessary. One carton can last for days and a man has a fresh supply right at his fingertips.

# . . . He stays on the job

## *The difference is . . . Scott Wipers*

Check your production line. See how much time the men are forced to waste each day in order to keep supplied with fresh wiping material.

Not so with Scott Wipers. These are disposable wipers. Complicated distribution is ended. So is sorting, baling, handling and laundering.

Your local Scott representative or distributor stands ready to demonstrate the Scott Wiper in your plant. Call him or mail this coupon today.

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Send details on Scott Wipers.

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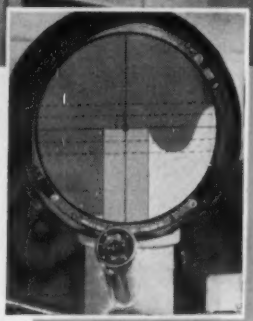
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*Grind* **High Precision Profiles Directly from the Drawing** *with*

# SHEFFIELD'S MICRO-FORM GRINDER



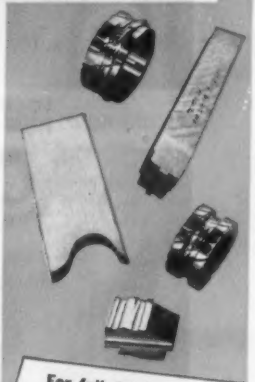




## FEATURES

- Grinds both flat and circular profiles
- No restrictions on profile intricacy
- No templates needed
- Perfect toolroom accuracy
- Saves up to 75% on profile work
- Final accuracy checked while work is still on the grinder
- Accuracy not affected by wheel wear
- No special wheel dressing required as wheel can be set at any angle—fewer wheels are needed
- Diamond impregnated wheels used in grinding carbides last longer—no waste as no special dressing is required
- Multiple work parts ground simultaneously
- Grinds any material including carbides
- Controlled by 50:1 pantograph and 30 power scope and viewing screen

*The Sheffield Corporation*
*Dayton 1, Ohio, U.S.A.*
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SHEFFIELD MASTER CRAFTSMANSHIP HEADQUARTERS

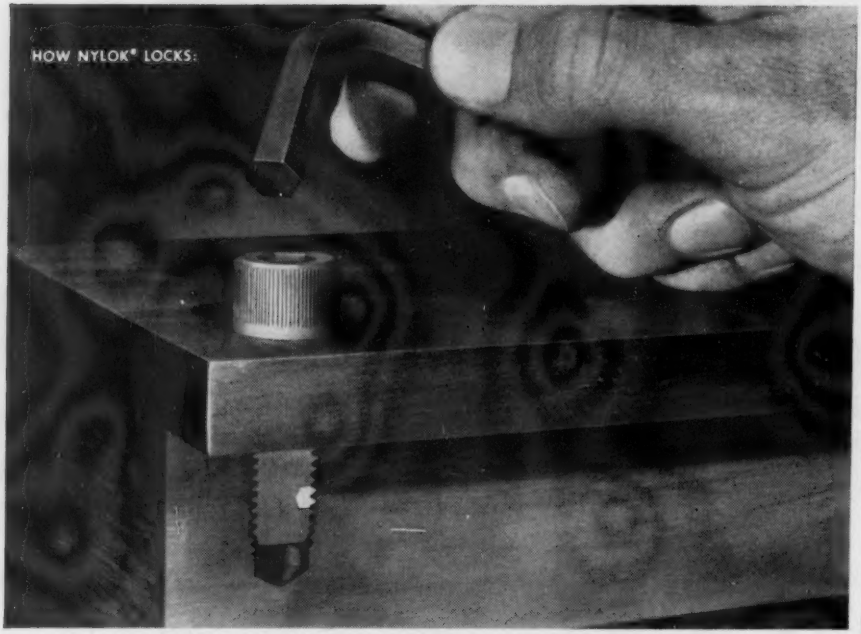
SHEFFIELD

7124

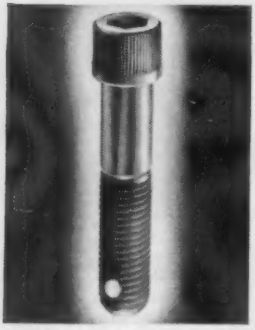
For full details and specifications ask your Sheffield representative for Bulletin MFG-122-51 or write us direct.

For more data circle **316** on Reader Service Card

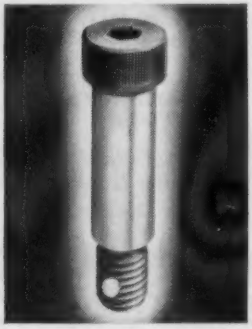
# NEW—a complete line of socket screw products



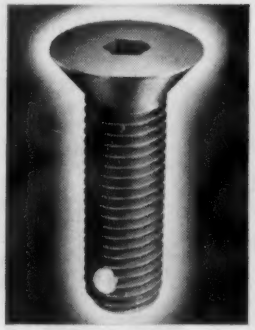

**LOCKED!** The tough, resilient nylon pellet keys itself into the mating threads. It forces threads together, and locks the screw securely.



**Socket head cap screws.** Standard sizes #6 to 1 in.



**Socket shoulder screws.** Standard sizes ¼ to ¾ in.



**Flat head socket screws.** Standard sizes #6 to ¾ in.

# self-locking UNBRAKO that won't work loose

## They simplify design and save production time

UNBRAKO socket screws are now available embodying the Nylok* self-locking principle. Nylok provides a truly practical new solution to the problem of making screws self-locking.

An UNBRAKO screw with Nylok is a single self-locking unit. No auxiliary locking devices are needed. Just thread the UNBRAKO into any tapped hole. *Seated or not*, it locks positively wherever wrenching stops. The tough, resilient nylon pellet forces mating threads together and holds tight. The screw will not shake loose.

You save production time when you build products with self-locking UNBRAKOS. And you get greater simplicity in design with less bulk and weight. The number of parts you must assemble to achieve full locking action is reduced to the absolute minimum. Lockwashers under screw heads are no longer necessary. Costly wiring of cross drilled heads is eliminated. So are cotter pins and complex multiple set screw installations.

Self-locking UNBRAKOS are completely reusable. They have uniform locking and installation torques—with no galling or seizing on mating threads. They successfully withstand temperatures from —70° to 250°F. And, on properly seated screws, the pellet acts as a liquid seal.

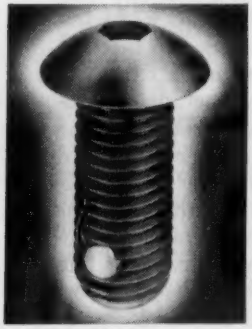
Self-locking UNBRAKO socket screws come in a complete range of standard sizes and materials. See your authorized industrial distributor. Technical data and specifications are detailed in Bulletin 2193. Write us for your copy today. Unbrako Socket Screw Division, STANDARD PRESSED STEEL Co., Jenkintown 22, Pa.

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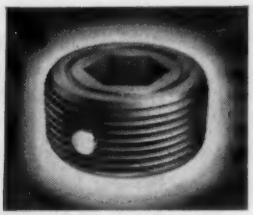
STANDARD PRESSED STEEL CO.

UNBRAKO SOCKET SCREW DIVISION SPS

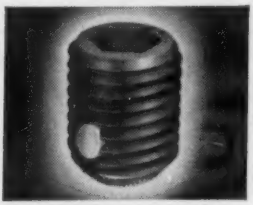
JENKINTOWN PENNSYLVANIA



**Button head socket screws.** Standard sizes #6 to ⅜ in.



**Socket pressure plugs.** Standard sizes ⅛ to 1¼ in.



**Socket set screws.** All standard point types. #6 to 1 in.

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# ideas from readers

ideas from readers

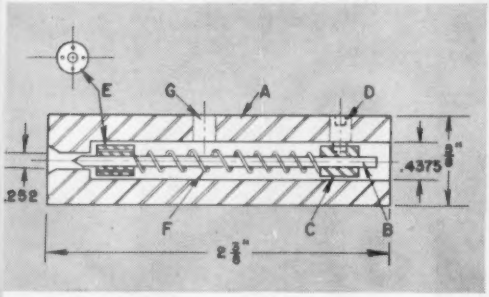
*Several time-saving ideas and suggestions for the man in the machine shop.*

## Device for End Drilling Round Stock

By B. L. KNAPP

**We were confronted with the problem of drilling and tapping a 3/16-inch hole** in each end of 30,000 pieces of stock 8 inches long x ¼ inch in diameter. To eliminate the center drilling operation that would ordinarily be required on each end of each piece, we devised the device shown in the accompanying sketch.

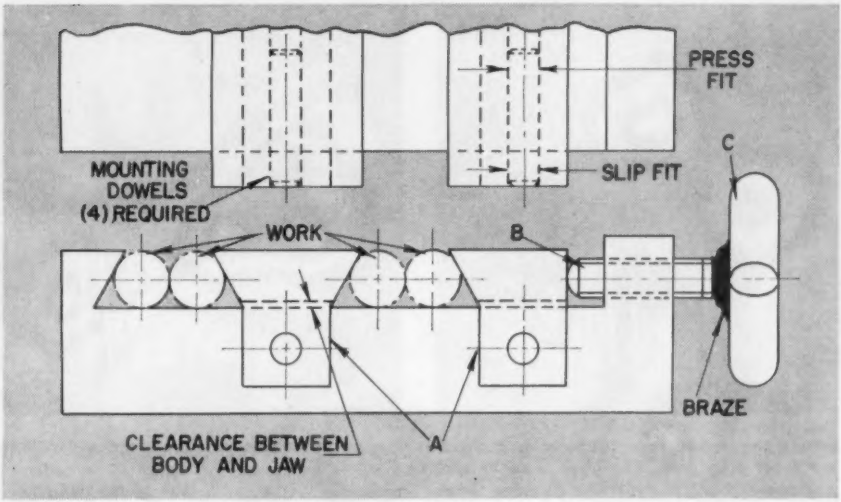
Used in the turret of a Hardinge lathe, the device consists of a piece of drill rod, *A*, which is machined to the shape and dimensions shown and then heat treated. Contained in the fixture thus produced is a No. 36 drill, *B*, which is supported at one end by a 0.435-inch diameter by ¼-inch wide piece, *C*, in the manner shown and prevented from rotating by means of a 3/16-inch set screw, D. At the other end within ⅛ inch of the tip, the drill is supported by a 0.435-inch diameter by ¼-inch wide floating follower, *E*, having four blowout holes equally spaced around the drilled hole in the center of the follower.




*Cross-sectional sketch of a device designed for use in the end drilling of round stock.*

To use, the device is fed toward the workpiece which is held and rotated by the lathe headstock. As the end of the work enters the tapered hole in the end of the fixture, the drill commences to machine the desired hole. Continued feeding of the device causes the follower support to be forced back, thereby compressing a spring, *F*. When the drill has reached the desired depth, the device is withdrawn, allowing the spring to force the follower support back to its original position.

A tapped hole, *G*, in the fixture allows for the attachment of an air




*Sketch of effective design of work-holding fixture for holding four pieces of round stock.*

hose to blow chips out of the fixture. The air hose is controlled by means of a valve which is actuated automatically by means of a latch on the turret slide of the lathe.

★ ★ ★

## Work-Holding Fixture for Cylindrical Pieces

By F. C. ELMO

**An effective design of work-holding fixture** for holding four round pieces of stock is shown in the accompanying sketch. Clamping pressure is equalized by the use of two jaws, *A*, which swivel on dowel pins as shown. Clamping pressure is supplied by a screw, *B*, on which is brazed a large hand knob, *C*, to provide for sufficient turning leverage.

This principle may be adapted to tapping fixtures, milling fixtures used for light milling, and many other types of work-holding devices.

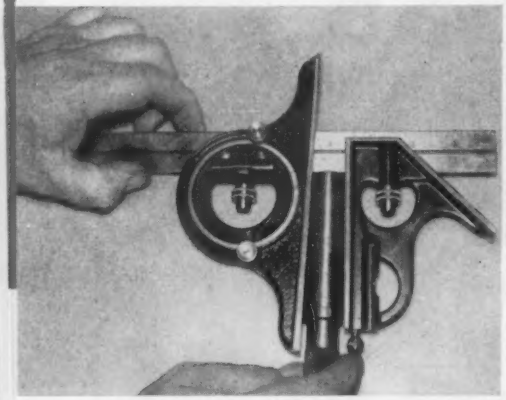
★ ★ ★

## Using Combination Square Set As External Taper Gage

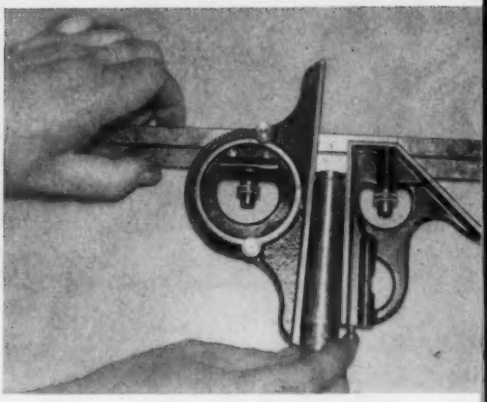
By H. J. GERBER

**Among the many uses for a combination square set** is the one depicted by the accompanying illustrations. If set up as shown, with the protractor head adapted to fit a master taper plug gage, the assembly makes a very efficient light check gage for the purpose of checking other tapers of the same size as the master.

It is understood that the protractor scale is not used to determine the

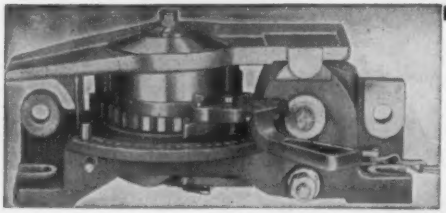


*Setting improvised taper gage with a standard taper plug gage. The gage is set in such a manner that no light can be seen when the gage is in contact with the plug gage.*



*Using the improvised taper gage. A light check is made by the operator in order to ascertain just how accurately the workpiece fits to the preset combination square gage.*

angular amount of taper as the graduations on the protractor are too coarse for this purpose. All checking is done on a comparative basis using

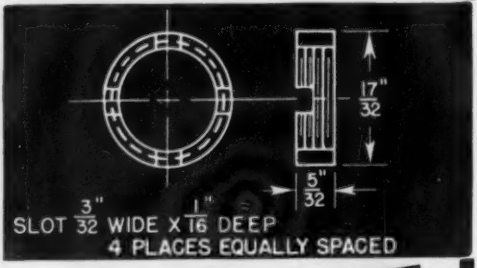



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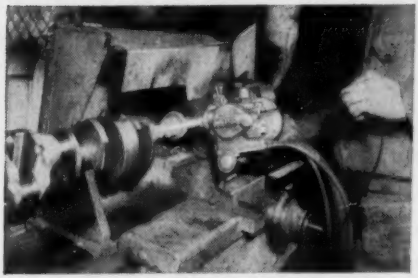

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# when mistakes happen...



Automotive crankshaft being brought up to inspection standards with metallizing. This automotive manufacturer formerly used plating for this type of salvage, worked one per hour. With metallizing, the salvage operation requires only 5 to 10 minutes per shaft, including surface preparation.

...and they do in any busy machine shop, there's no need to scrap a mis-machined or otherwise damaged machine part that represents an investment of many expensive man-hours.

Parts like these are brought up to inspection standards quickly, easily and inexpensively with metallizing.

And with the new molybdenum metallizing wire, Sprabond, the only surface preparation required is cleaning. The molybdenum forms a molecular bond with the surface being rebuilt. Little heat is generated, eliminating any danger of warpage.

What's more—users have found that the extreme hardness of the molybdenum coating, and its microscopic porosity which provides superior lubricating characteristics, improve its "wear-ability" over ordinary bearing surfaces as much as 25 times. **You haven't just salvaged a part—you've improved it.**



## *Free Bulletin*

Get the full story on metallizing in production salvage. Bulletin 57-C describes and illustrates the procedures, provides data on typical parts, with interesting photo-micrographs showing the unique bonding action of Sprabond Wire. Send for a copy.

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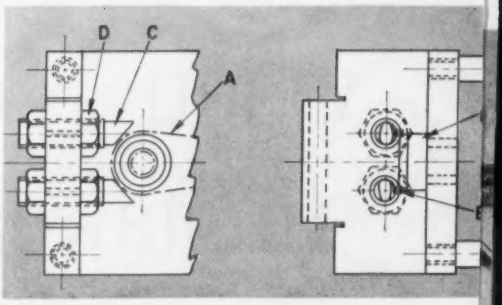
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a light source to compare the fit of the work to the fit of the master gage.

★ ★ ★

## Adjustable Work Locators for Drill Jig

By CLIFF BOSSMANN

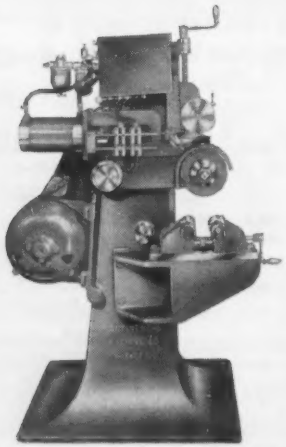



*Drawing showing top and end views of a drill jig with adjustable locators.*

**When designing a drill jig or holding fixture,** the problem frequently arises of providing an arrangement for properly locating a piece part on which the outline varies. An effective design that will solve this problem is shown in the accompanying drawing.

The piece part *A* rests on a hardened button, *B*, and is positioned against movable locators, *C*. These locators may be moved in order to conform with the periphery of the piece part. After they have been adjusted, the locators may be locked in place by tightening the two hex nuts, *D*. The locators are prevented from moving radially by the keys, *E*.

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An X.F. (*Extra Fine*) Swiss Pattern file is shown here. It is one of hundreds of Swiss Pattern types and sizes. In addition there are literally thousands of cuts, sizes and shapes of Regular and Special Purpose Nicholson and Black Diamond files for all industrial filing needs. These fine tools needn't be treated with the exaggerated care that Merton is showing in the cartoon. But they'll cut faster and last longer if you keep them clean and keep them in a file rack. As Pop says, good files deserve good care.

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***A FILE FOR EVERY PURPOSE***

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# new literature

new literature

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Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. Detailed information on carbide applications.

**4. Valve-In-Head Cylinders**
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**5. Jib Cranes**
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**8. Draw Formers**
Cyril Bath Co., 32400 Aurora Rd., Solon, Ohio. Contour stretch formers and radial draw formers.

**9. Grinding Technique**
Bay State Abrasive Products Co., Westboro, Mass. Booklet entitled "Electronic Formulation."

**10. Carbide Blanks**
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**11. Protective Coatings**
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**14. Pedestal Drill**
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**15. Carbide Tools**
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**16. Handling Systems**
The Cleveland Crane & Engineering Co., Cleveland Tramrail Division, Wickliffe, Ohio. Overhead materials handling systems.

**17. Surface Plates**
Collins Microflat Co., Inc., 2326 E. Eighth St., Los Angeles 21, Calif. How to calibrate surface plates.

**18. Broaching Machines**
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### 30. Machinery Mounting
The Felters Co., 210 South St., Boston 11, Mass. "Facts About Anchoring Precision Machines on Type T Unisorb."

### 31. Hydraulic Valves
The Fulflo Specialties Co., Inc., Blanchester, Ohio. Oil-relief, by-pass hydraulic valves.

### 32. Turret Lathes
Gisholt Machine Co., Madison 10, Wis. Masterline ram type universal turret lathes.

### 33. Belt Grinder
Grinding & Polishing Machinery Corp., 2530 Winthrop Ave., Indianapolis. Ind. G & P 6-72 abrasive belt type grinding machine.

### 34. Wrought Alloy
Haynes Stellite Co., Kokomo, Ind. Hastelloy Alloy R-235—a vacuum-melted wrought alloy with unusual high-temperature properties.

### 35. Gage Handles and Blanks
Huron Machine Products, Inc., 6252 Monroe Blvd., Dearborn, Mich. Wire type reversibles, taper locks, trilocks, plain rings, thread rings, master setting discs and ball handles.

### 36. Drill Head
Jersey Manufacturing Co., 401-C Livingston St., Elizabeth, N. J. Arbo 2—the automatic indexing turret type drill head.

### 37. Guide Pin Bushings
Lamina Dies & Tools, Inc., P.O. Box 31, Royal Oak, Mich. Guide pin bushings, guide pins, stripper guide pins and bushings.

### 38. Engine Lathe
The R. K. LeBlond Machine Tool Co., Cincinnati, Ohio. Detailed information on sixteen inch heavy-duty engine lathe and plain bed gap lathe.

### 39. Heating Equipment
Lepel High Frequency Laboratories, Inc., 55th St. and 37th Ave., Woodside 77, New York City, N. Y. High frequency induction heating equipment.

### 40. Furnace Accessories
Lindberg Engineering Co., Lindberg-Fisher Division, 2469 W. Hubbard St., Chicago 12, Ill. Complete line of auxiliary items used in conjunction with melting furnaces in the foundry.

### 41. Safety Guides
The McGonegal Manufacturing Co., E. Rutherford, N. J. Themac drill press safety guides.

### 42. Marking Machines
Jas. H. Matthews & Co., 3944 Forbes St., Pittsburgh 13, Pa. Equipment from light-duty bench mounted units to heavy-duty automatic machines for marking round, flat and contour-surfaced products.

### 43. Cutting Tools
Metal Carbides Corp., Youngstown 12, Ohio. Aluminum oxide cutting metals, tool tips, throw-away inserts, cylinders and other machine turning and cutting tools.

### 44. T-Nut and Stud Sets
Montgomery & Co., Inc., 53 Park Pl., New York City 7, N. Y. T-nut and stud sets and step block sets.

### 45. Boring Tools
Moore Special Tool Co., Inc., 730 Union Ave., Bridgeport 7, Conn. Complete line of boring tools for toolroom or production use.

### 46. Cutting Tools and Dies
J. I. Morris Co., 394 Elm St., Southbridge, Mass. Miniature taps, dies, screws, drills and tools.

### 47. Walkie Trucks
The Moto-Truc Co., 1959 E. 59th St., Cleveland 3, Ohio. Complete line of electric powered walkie trucks.

### 48. O. B. I. Presses
Niagara Machine & Tool Works, Buffalo 11, N. Y. Series E front-to-back crankshaft inclinable presses.

### 49. Toolroom Grinding
Norton Co., Worcester 6, Mass. General tool grinding, carbide tools and cast alloy tools.

### 50. Centerless Grinders
Osborn Manufacturing Co., 5401 Hamilton Ave., Cleveland 14, Ohio. Centerless brushing method for precision finishing of cylindrical parts.

### 51. Production Benders
Pedrick Tool & Machine Co., Dept. 5, 3640 N. Lawrence St., Philadelphia 40, Pa. Production benders for pipe tube or structural metal bending operations.

### 52. Lapping Compounds
Penn Scientific Products Co., Abington, Pa. Microfinishing and precision lapping compounds and accessories.

### 53. Bending Machines
Pines Engineering Co., Inc., 643 Walnut, Aurora, Ill. Small, compact bender features pivoting head design, which permits left or right-hand operation.

### 54. Force Welders
Precision Welder & Flexopress Corp., 3522 Ibsen Ave., Cincinnati 9, Ohio. Magnetic force welders.

### 55. Chuck for Draw Collets
R. C. Machinery Co., 4714 N. Pulaski, Chicago 30, Ill. Davos chuck for draw collets.

### 56. Grinding Machine
Ready Tool Co., 554 Iranistan Ave., Bridgeport 5, Conn. Cylindrical grinding machine, lathe centers and grinder dogs.

### 57. Air Gage
The Sheffield Corp., Division 610, Dayton 1, Ohio. Principles of air gaging with column "Precisionaire."

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With this new and different slide rule type comparison chart you can check 21 essential specifications of 8 leading heavy duty milling machines. Compare their capacity, speeds, feeds, etc., at a glance.

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### 58. Industrial Service Tools
Snap-on Tools Corp., Kenosha, Wis. Chests, cabs, wrenches, sockets, screwdrivers, pliers, pulling equipment, tool assortments and so on.

### 59. Aircraft Fasteners
Standard Pressed Steel Co., Box 556, Jenkintown 22, Pa. High strength steel aircraft bolts, designated as Hi Psi EWB-22, and EWN-22 hight strength locknuts.

### 60. Measuring Tools
The L. S. Starrett Co., Athol, Mass. Mechanics hand measuring tools and precision instruments, steel tapes, steel rules, dial indicators and dial gages, hacksaws, hole saws, band saws, precision ground die and flat stock.

### 61. Bearing Grease
Sun Oil Co., Philadelphia 3, Pa. N-52X —a stable, high-melt-point grease for bearings running at temperatures up to 250 degrees F.

### 62. Speed Reducer
Supreme Products Corp., 2222 S. Calumet, Chicago, Ill. Versamatic Professional Model No. 4000-P reversible speed reducer with Yankee type bit holder.

### 63. Testing Sets
Taber Instrument Corp., 111 Goundry St., N. Tonawanda, N. Y. Standard abrasion testing set, Model 174.

### 64. Electric Furnaces
Thermo Electric Manufacturing Co., 488 Huff St., Dubuque, Iowa. Electric furnaces, temperature controllers and hot plates.

### 65. Taps
Threadwell Tap & Die Co., Greenfield, Mass. Basic information on taps, their uses and description.

### 66. Dust Collection
Torit Manufacturing Co., 296 Walnut St., St. Paul 2, Minn. "You Can Solve That Dusty Cost Problem."

### 67. Test Equipment
Trop-Arctic, Inc., 627 S. Mulberry St., Muncie, Ind. Environmental test equipment and ultra low temperature equipment for shops and plants.

### 68. Air Presses
Van Products Co., 5700 Old Ridge Rd., Erie 7, Pa. Bench-type air presses, air arbor presses and small platen-type air presses.

### 69. Perforating Dies
S. B. Whistler & Sons, Inc., 740 Military Rd., Buffalo 23, N. Y. Magnetic perforating dies for perforating materials up to and including ¼ inch thick mild steel.

### 70. Machine and Hand Tools
Whitney Metal Tool Co., 720 Forbes St., Rockford, Ill. Punches, shears, presses, brakes, small tools and a wide assortment of other types of metalworking products.

### 71. Oil Groover
Wicaco Machine Corp., 4801 Stenton Ave., Wayne Junction, Philadelphia 44, Pa. Continuous oil groover that cuts grooves of all descriptions: internal or external, continuous or intermittent grooves.

### 72. Tool Steel
Wiedemann Machine Co., Heat Treating Division, 4219 Wissahickon Ave., Philadelphia 32, Pa. Interesting booklet entitled "Factors to Consider About Tool Steel."

### 73. Special Machines
Wisconsin Drill Head Co., 4983 N. 124th St., Butler, Wis. Specially designed machines can help automate your high production drilling, tapping, reaming, boring, spot-facing and milling operations.

### 74. Power Presses
Zeh & Hahnemann Co., 186-8 Vanderpool St., Newark 5, N. J. Standard, high production type presses and power percussion type presses.

***Here's an interesting Idea-Book for you!***




**NEW!**

**Sundstrand**
**Magnetic Chuck Catalog for Grinders**

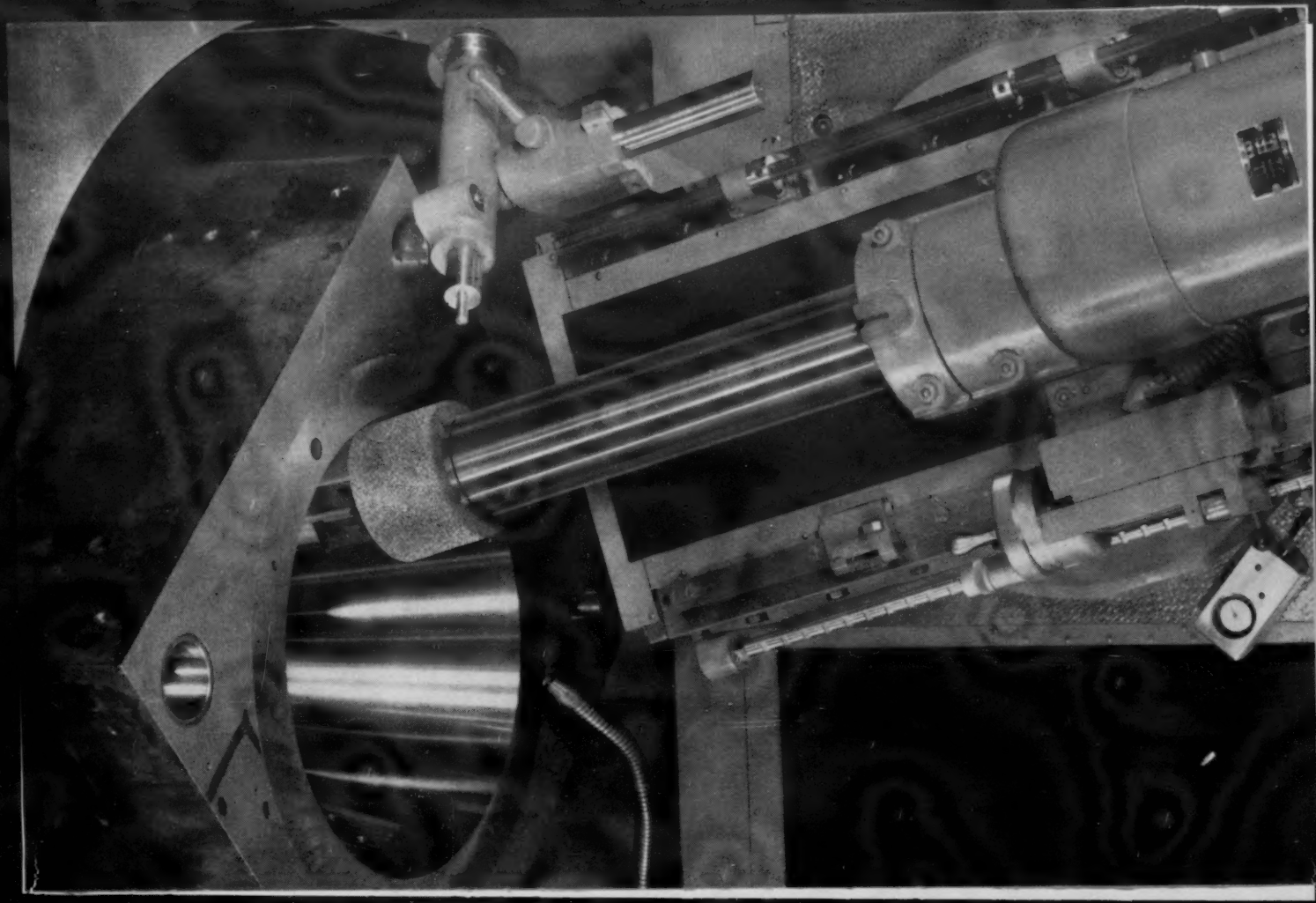
Manufacturers and owners of grinding machines will both find many time-saving and profitable work holding ideas in this new 12-page book.

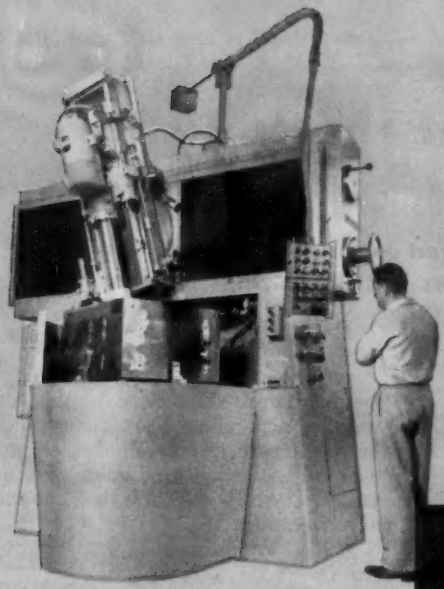
Simplification of set-ups, powerful holding of heavy work plus many other features are included. Write for your copy today. Ask for Bulletin 572-M.

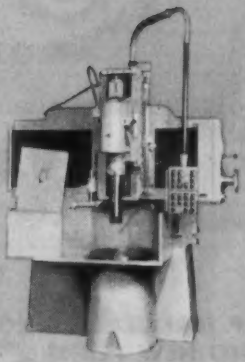
SUNDSTRAND POWER-GRIP ®

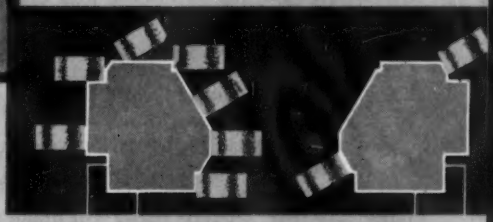
**SUNDSTRAND**
**Magnetic Products Co.**
Division of Sundstrand Machine Tool Co.
1020-9th ST. • ROCKFORD, ILLINOIS

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# one setup: nine jobs

As flexible, as responsive as a dentist's drill, a Springfield Vertical Universal Grinder can reach around and into a workpiece to do nine different jobs on one chucking.

If you make a pipeline valve, a mold, a bearing race—requiring micro-inch finish on any or all the faces shown in the diagram—at whatever angle—look into Springfield. These grinders cut down the number of set-ups, frequently eliminate hand-lapping, operate with fewer work-holding devices. And, as a bonus, on jobs calling for extreme concentricity, one angle setting of the Springfield head grinds both faces of mating parts.

All three models readily adaptable to special problems.

Vertical Universal Grinders: swings 18", 24" and 42".

Lathes: Engine and tool room, contouring and reproducing—swings 14" to 32".

*The Springfield Machine Tool Company*
*Springfield, Ohio*

65TH YEAR OF BUILDING IDEAS INTO MACHINE TOOLS

SPRINGFIELD

# news of the industry

news of the industry

***New plants and expansions . . . company name changes . . . new appointments.***

## S-P MANUFACTURING MOVES INTO NEW PLANT

The S-P Manufacturing Corporation, makers of power chucks and cylinders, recently completed the move into its new plant located in Solon, Ohio. The new plant, which is of steel, brick and stone construction, provides for all engineering and manufacturing operations, as well as the executive office facilities.

According to an official of the company, the new, modern plant will make possible improved service to the continually expanding list of customers for the lines of power chucks, air and hydraulic cylinders, and valves and accessories, which S-P has been manufacturing since 1916.

★ ★ ★

## NEW COMPANY FORMED

Announcement was recently made of the formation of a new distributing company, to be known as Opto-Metric



*Wash drawing showing the new plant for S-P Manufacturing Corporation, Solon, Ohio.*

Tools, Inc. This firm is located at 137 Varick St., New York 13, N. Y. The company will specialize in optical measuring tools, both domestic and foreign, with a nationwide selling and service organization. Fritz Koenig is president and general manager.

R. S. Wilder, Inc., Waltham, Mass., has acquired part ownership in this new organization. In addition, R. S. Wilder has appointed Opto-Metric Tools, Inc., as its national and foreign distributor for micro-projectors, optical comparators and micrometer measuring stages.

★ ★ ★

## NEW WHEEL TRUEING DIVISION

It was recently announced that the Wheel Trueing Tool Company has moved its expanding Water Swivel Department into full status as a division of the firm. The new Water Swivel Division produces and markets Truco diamond drilling machines, water swivels, drills and diamond bits. The 46 year old Wheel Trueing Tool Company is a pioneer in diamond tool development, having originated many diamond drilling tools and techniques used by the mining and oil industries and by industry in general.

Karl J. Klapka, chief engineer of the Water Swivel Division, has been appointed sales manager. Mr. Klapka joined the firm in 1947 as a field engineer for the Diamond Drill Division. A member of the American Institute of Mining, Metallurgical and Petroleum Engineers, he was for two years a pe-





If it's a problem in nonferrous tooling, we'll "bend every effort" to help you. Our experience in this field is helping many others to increase production and reduce tool costs. If you have not yet tried our **FORM RELIEF FLAT DRILLS** for I.D. tooling, send us your tool prints or parts prints today for quotations.

**B & W PRECISION PRODUCTS CO.**
11393 E. Eight Mile Rd., P.O. Box 3865, Detroit 5, Mich.

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VIMCO Lights
are instantly adjustable



Move them right, left . . . up or down . . . Vimcolights position quickly to throw soft, comfortable light on the work. No bolts or screws to loosen, then reset. Vimcolight's sturdy, flexible steel arm and wide range lamp swivel permit instant adjustability. Wiring is fully enclosed. Write today.

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troleum engineer with the Shell Oil Company, based in Midland, Texas. Mr. Klapka was graduated from the University of Wisconsin with a bachelor of science degree in mining and metallurgy. He is president of Detroit's Sigma Nu Alumni Association.

Ted E. Deyo has been named supervisor of the order department, scheduling and shipping in the new division. Mr. Deyo joined the firm's Diamond Tool Division in 1943 and later transferred to the Mining and Drilling Division. He was secretary to the Detroit engineer for bridges and buildings of the New York Central System.

★ ★ ★

## FIRTH STERLING ACQUIRES RESEARCH LABORATORY

The Yonkers, New York, research and laboratory facilities of the Schwarzkopf Development Corporation — formerly American Electro Metal Corporation—have been acquired by Firth Sterling, Inc., Pittsburgh, Pennsylvania, at an undisclosed price. These facilities will be operated as the American Electro Metal Division, Firth Sterling, Inc. At the same time, a license agreement in the field of cemented tungsten carbides has been concluded between the two companies. The two firms are also jointly interested in Borolite Corporation of Pittsburgh, a manufacturer of products for ultra-high-temperature applications.

It was stated that the company not only intends to maintain the Yonkers organization and facilities, but also plans to expand them gradually. Among other things, the company will continue in Yonkers the important research projects in which that laboratory is presently engaged.

# cut it with CAPEWELL stop



# power hack saw blades

**THE USER:** Edgcomb Steel Company, Philadelphia, Pennsylvania
**THE MATERIAL:** High Speed Steel Billets
**THE JOB:** Maintaining precision-true hack sawing
**THE PROBLEM:** Uneven cuts and excessive blade breakage
**THE ANSWER:** Capewell Safetech Power Hack Saw Blades
**THE RESULT:** Power hack sawing now a routine operation—no more production headache

Edgcomb Steel Company chose Capewell's shatterproof Safetech blade for this long, heavy job because they could get more cuts per blade, quickly and economically under heavy feed, while providing complete operator safety. Other Capewell power hack saw blades are Technite and High Speed—each of these all-hard blades is designed to give proved maximum sawing performance.

You, too, can improve your production by standardizing on Capewell Power Hack Saw Blades. Tooth by tooth, you'll find that Capewell blades are a superior product, manufactured to rigid specifications, so that you can be assured of blades that stay sharper longer.

75 CAPEWELL ANNIVERSARY

*SOLD ONLY THROUGH CAPEWELL DISTRIBUTORS who provide: complete inventory . . . engineering assistance . . . delivery when you need it.*

**THE CAPEWELL MANUFACTURING COMPANY**
Hartford 2, Connecticut

Please send complete details on Capewell Power Hack Saw Blades to:

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COMPANY_____
ADDRESS_____
CITY_____ ZONE_____ STATE_____

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## METAL FINISHING SHOW

More than 35 manufacturers of machine tools, which grind and polish with coated abrasives, will exhibit their newest developments to the metalworking industry at the Metal Finishing Show to be held October 30th through November 2nd in Cleveland, Ohio. The working exhibit will be sponsored by Behr-Manning Co., Troy, N. Y., a division of Norton Company. The exhibit will take place at 4101 West 150th Street, the abrasive manufacturer's Cleveland branch office.

This event will afford designers, production men, quality control men and machine operators an opportunity to submit their "problem children" components and products to actual grinding and polishing tests on almost every coated abrasive machine tool developed in this country since the Fall of 1954, when the first of these shows took place in Chicago. For this specific purpose, exhibits will be staffed by technical representatives of the machine manufacturers, as well as by abrasive specialists of Behr-Manning.

Machines to be demonstrated, many for the first time, will range from heavy automatic and semi - automatic grinders, used in automobile and appliance production lines, to highly specialized belt machines which reach into small-radius contours. In capacity, they will cover the en-



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# IN ELECTRIC-WELD PIPE AND TUBE MAKING

## to higher speeds and quality at lower cost

## Yoder leads the way

In the short period from 1938 to 1955, the production of electric welded pipe and tubing grew from 269,000 tons to over 3,000,000 tons. This phenomenal rate of growth—over two and one-half times faster than that of the pipe and tube making industry as a whole—to a large extent resulted from a series of important improvements in tube mill design, all introduced by Yoder.

First came the Yoder rotating welding transformer, in 1938. The economic and other benefits conferred by this epoch making innovation were further augmented by other technological advances scored by Yoder in the years that followed. The result was that electric-weld pipe and tube making became the child prodigy of the fast growing pipe and tube making industry.

Latest, and perhaps the greatest, of these developments is the cold forming and induction welding at high speeds of *aluminum, magnesium, brass, nickel, monel, and other non-ferrous metals and alloys.* This process is especially economical for making light and medium gauge tubes in sizes up to 8 in. dia. More and more leading non-ferrous metal producers and fabricators are installing these mills.

More complete information about this and other interesting Yoder developments in pipe and tube mill equipment may be had merely by asking for any of the following publications:

- ☐ Resistance-Weld Mills for making Steel Tubing up to 4" diameter.
- ☐ Induction-Weld Mills for making Non-ferrous Tubing.
- ☐ Resistance-Weld Mills for Steel Pipe up to 24" diameter.

**THE YODER COMPANY**

**5532 Walworth Avenue** **Cleveland 2, Ohio**

ENGINEERING YODER MANUFACTURING

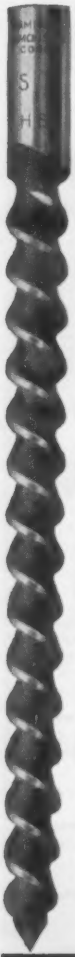
**PIPE AND TUBE MILLS—Electric Weld**

**ROTARY SLITTING LINES**

**COLD ROLL FORMING MACHINES**

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# 4 Reasons why you should use GAMMONS DIE REAMERS



- Specially treated for today's modern die steels.
- Rapid cutting capacity.
- Tapers per inch .005, —.008, —.013 in stock.
- Large range of standard sizes in stock at all times for your convenience.

*WRITE FOR COMPLETE INFORMATION*

**GAMMONS • HOAGLUND CO.**
MANCHESTER 2, CONN.
*Manufacturers of helical taper pins, chucking, die makers and special reamers.*

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tire field of metalworking, from brute-force grinders, capable of removing 0.100 inch per pass, down to portable sanders and the miniature belt machines which polish the smallest of jet engine blades with extreme precision.

Several times daily, Behr-Manning product engineers will conduct 30-minute classes, showing industrial users when to specify aluminum oxide or silicon carbide abrasives, for example, for fast cutting and cool operation; comparing the performance of cloth and paper belts; discussing recommended belt speeds, grit sizes, coolants and lubricants; and demonstrating on steels, non-ferrous metals and alloys. In addition, a new color motion picture on metalworking will have its first showing at the Cleveland exhibit.

★ ★ ★

## WARNER AND SWASEY TO EXPAND

The Warner & Swasey Co., Cleveland, Ohio, is contemplating a $2,800,000 expansion program for the construction of additional manufacturing space and the acquisition of additional machinery and equipment. This expansion, which will be completed late in 1957, will increase the company's machine tool capacity by approximately 25 per cent. The cost of the expansion will be met from the proceeds of the company's recent issue of additional common stock, which totaled approximately $4,000,000.

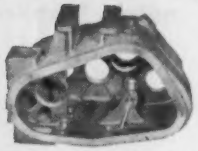
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## POTTER & BRUMFIELD EXPAND PRODUCTION FACILITIES

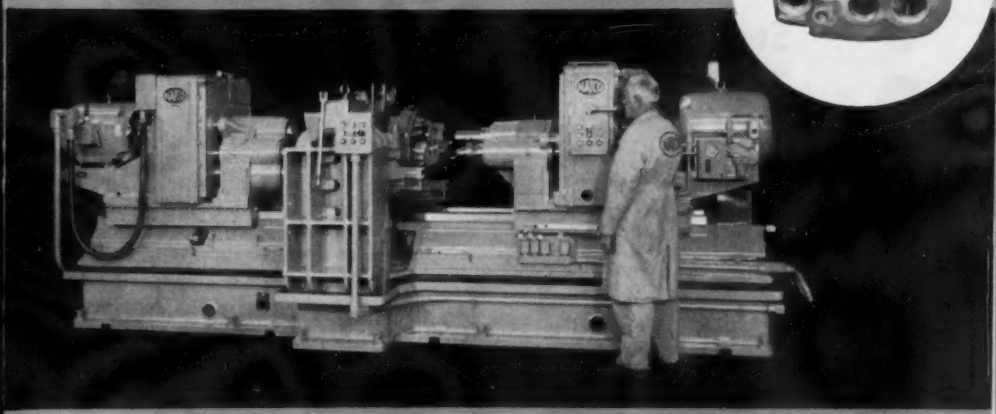
Potter & Brumfield, Inc., manufacturers of a wide line of relays for the

# Natco® Automatic Matches Boring Mill Accuracy

*and quickly converts for five different jobs*







This Natco two-way machine stepped in where automatics "fear to tread!" It replaced a precision boring mill, speeded production and didn't give up a tenth in accuracy! At The Frank G. Hough Co. boring mills were used for exacting tolerances on transmission parts for the Hough Payloader®. Higher production was desired.

Now with a Natco two-way automatic, Hough is getting production rates—not job shop rates. The Natco bores diameters to within .0005"—square with mounting face within .0005" per inch bore length. The machine also chamfers, counterbores and notches boss contours.

Versatile too! Hough processes five different transmission housings or covers with a single machine. After a typical production run averaging 100 parts, the machine is quickly converted to another job.

Ask for information about the PAYD (Pay-As-You-Depreciate) Finance Plan.

*Currently 86% of Natco's shipments are on or ahead of schedule.*

Call Natco offices in Chicago, Detroit, Buffalo, New York, Boston, Philadelphia, Cleveland and Los Angeles; distributors in other cities.

**National Automatic Tool Company, Inc.**

*Richmond, Indiana*

NATCO

Multiple-spindle drilling, boring, facing and tapping machines. Special machines for automatic production.

electrical and electronic industries, has completed plans to expand production facilities to more than 125,000 square feet. The company, a subsidiary of American Machine & Foundry Company, has completed construction of a 16,000 square foot building addition in Princeton, and has leased another with a total of 15,000 square feet in Franklin, Kentucky. The company has also purchased four acres of land adjacent to the main plant in Princeton for construction of additional plant facilities, as needed.

Production operations are now being moved into the new building in Princeton which will serve as an annex to the main plant. The Franklin plant will be operated as a branch manufacturing facility and it is expected to be in production in the near future. Another branch plant, the Sterling Engineering Division, is located in Laconia, New Hampshire. The general management, sales, engineering and accounting functions for all plants will continue to be conducted in the plant in Princeton, Indiana.

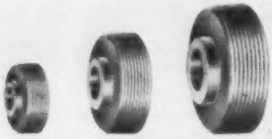



REED

**Standardized THREAD ROLLS and HOLDERS**



for Single Thread Roll Applications on **STRAIGHT or TAPER PIPE THREADS**



Tool engineers, setup men and operators have accepted enthusiastically Reed's standardization of thread rolls for single roll applications. These rolls with the new Reed Single Roll Holder provide a complete package of simple thread rolling tools of wide capacity. Special rolls also available for all types of holders.

*Write for Thread Roll Bulletin 1-15*

**REED ROLLED THREAD DIE CO.**

*Specialists in Thread and Form Rolling Tools and Equipment*

WORCESTER 1, MASSACHUSETTS, U.S.A.

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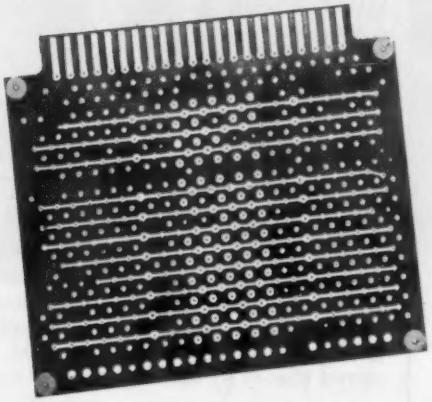
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## EX-CELL-O WINS AWARD

In recognition of his leadership of the United States Savings Bond Program at Ex-Cell-O Corporation, H. G. Bixby, president, was recently presented with the Achievement Award of the

# TRACER-GUIDED DRILLING
## 100 HOLES P. M.
WITH NEW HERMES **Engravograph**

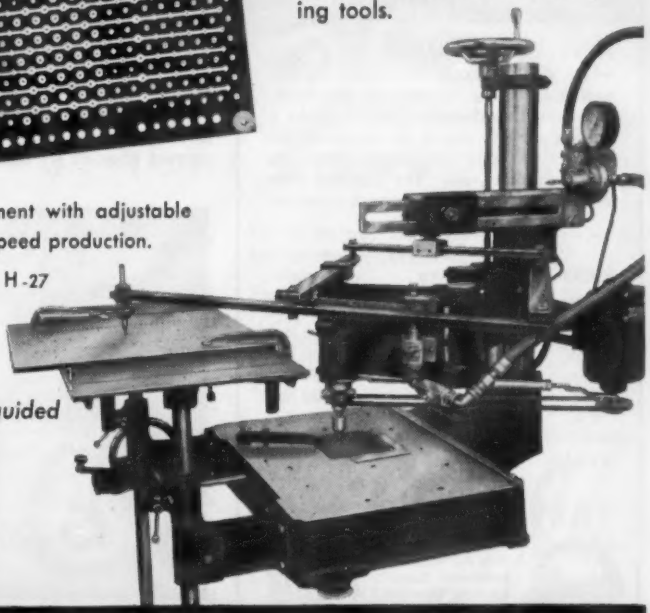
***for printed circuit plates***



- Pantograph reproduces drill pattern from template in any reduction ratio — assuring high accuracy.
- Allows drilling and routing of different size holes in one operation without changing tools.

Pneumatic attachment with adjustable feed gives high speed production.

Ask for catalog H-27



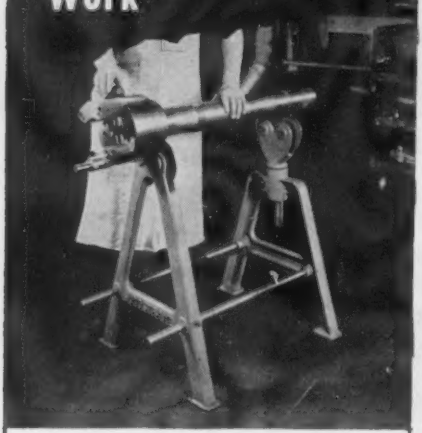
*Also for tracer-guided*

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## Balancing Tools for a Wide Range of Work



Here's a complete line of Balancing Tools which will save their cost quickly on balancing or truing operations. Accurately sensitive and durable, they provide a simple, reliable means for checking the balance of parts like gears, shafts, fly wheels, pulleys, etc. The standard sizes available are shown in capacity chart below.

**CAPACITIES**

| Swing | Between Standards | Weight Capacity |
|---|---|---|
| 21 in. | 20 in. | 12 lbs. |
| 21 in. | 20 in. | 800 lbs. |
| 43 in. | 29 in. | 800 lbs. |
| 43 in. | 29 in. | 2,000 lbs. |
| 6 ft. | 5 ft. | 5,000 lbs. |
| 8 ft. | 8 ft. | 10,000 lbs. |
| Any | Any | 24,000 lbs. |
| 43 in. | 30 in. | 800 lbs. |

**FREE DATA**

SUNDSTRAND

You can obtain complete information on Sundstrand Balancing Tools by writing for bulletin 572.



**SUNDSTRAND MACHINE TOOL CO.**
2539 Eleventh Street, Rockford, Ill., U.S.A.

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United States Treasury Department. The award was made at Ex-Cell-O headquarters in Detroit by Noble D. Travis, Michigan Chairman of the Treasury's Savings Bond Division.

The award was symbolized by a copy of the first "little prayer of my own," composed and offered by Dwight D. Eisenhower immediately after he had taken the oath of office as the thirty-fourth President of the United States on the twentieth day of January, 1953. Beautifully reproduced in colors in medieval monastic style, the prayer reproduction was made even more unique by its enclosure in a frame constructed of wood that was used in the inaugural platform.

Mr. Travis revealed that only 12 such copies have been presented to Michigan business executives. He also said that, during the 15 year history of the Savings Bonds Program, Michigan has always achieved its quota, a record shared by only two other states.



*H. G. Bixby, Ex-Cell-O president, (left) accepts U. S. Treasury Savings Bonds Program Award from Noble D. Travis, Michigan Chairman, Treasury's Savings Bonds Division.*




# Fast work on a wide range of tool sizes

There's much you'll like about Ex-Cell-O Tool Grinders.

You'll like the power and smoothness made possible by the balanced inbuilt motor spindle that rotates in Ex-Cell-O Precision Bearings.

Ex-Cell-O Tool Grinders, such as Style 44-A pictured above, grind single point tools of carbide, cast alloys and high speed steels to long-lasting, sharp edges. Grooved, hardened steel plates in the tables resist wear and provide a good bearing surface for the tools. All Ex-Cell-O Grinders are double-end models; all use steel back wheels and have large, easy-to-adjust tool rest tables and coolant equipment.

Ex-Cell-O has a tool grinder to fit all types of operations. Why not write Ex-Cell-O or call your local Ex-Cell-O Representative?

**EX-CELL-O CORPORATION**
DETROIT 32, MICHIGAN
XLO

*EX-CELL-O FOR PRECISION*

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

56 - 53

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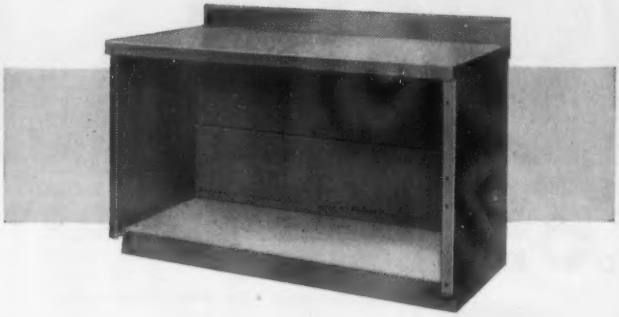
## FARREL-BIRMINGHAM ANNOUNCES ORGANIZATION CHANGES

Edward S. Coe, Jr., vice president of Farrel-Birmingham Company, Inc., Ansonia, Conn., and recently elected to the board of directors, has been appointed general manager of the company's Consolidated Machine Tool Division, Rochester, N. Y. He succeeds Lester D. Chirgwin, who formerly headed this division. Mr. Chirgwin recently requested a leave of absence, which will extend until the date of his formal retirement from the company at the end of the current year.

Mr. Coe was previously assistant to the president and was manager of the plants at Ansonia and Derby. In this latter capacity, he has been succeeded by Graham Hassard who, since 1943, was superintendent of Farrel's two foundries in Connecticut.

Richard D. Mace has been made manager of foundries. Mr. Mace's foundry experience with the company dates back to 1923, when he was employed as a patternmaker apprentice. In 1953 he became assistant superintendent of foundries, and a year ago transferred to the sales division to represent Farrel - Birmingham in New England. This post, now vacated by Mr. Mace, is filled by the appointment of G. Wells Eighmy, Jr. Mr. Eighmy, who received


save with standard



HALLOWELL CABINET BENCHES

HALLOWELL FEATURES

3 lengths, 4 heights, 4 widths—all standard

4 top materials—steel, Presdwood on steel, ShopTop, laminated wood

Functional design, neat appearance, plenty of protected storage space

Use them as single units or continuous benches of any length

Standard units with *standard* accessories permit you to *custom build* HALLOWELL Cabinet Benches to fit your requirements. Stocked by leading shop equipment dealers. Write for literature. STANDARD PRESSED STEEL CO., Jenkintown 22, Pa.

STANDARD PRESSED STEEL CO.

HALLOWELL SHOP EQUIPMENT DIVISION SPS JENKINTOWN PENNSYLVANIA

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his degree in basic engineering at Princeton University, was recently released after serving two years in the U. S. Navy. Prior to this, he had several years service with the Goodyear Tire and Rubber Company in Akron, Ohio.

Another change in the sales division of the company is that of Gould C. Christensen to the territory of the lower peninsula of Michigan, where he will handle the sale of the company's products. Prior to this, Mr. Christensen was in charge of the F-B foundry sales for the past ten years.

★ ★ ★

## SHEFFIELD DEMONSTRATES GRINDER TO DEFENSE PRODUCTION ENGINEERS

Precision performance of a new gear grinder, developed by The Sheffield Corporation, Dayton, Ohio, to help achieve higher volume output of extremely accurate gears powering modern weapons and aircraft and ordnance controls, was demonstrated in a comprehensive two-day series of evaluation tests conducted recently for approximately 100 officials of some of the nation's leading producers of equipment for the armed forces, military and government engineering and production specialists.

The demonstration, held by Sheffield engineers in cooperation with the Defense Department, put the company's new Model 140 Reciprocating Gear Grinder through an exhaustive series of tests. The showing illustrated the accuracy, great speed and versatility the grinder makes possible in production of automatic and other control mechanisms essential to the effi-



*Anywhere on the map..*

**J. K. SMIT custom Diamond Wheels are designed to fit your grinding needs**

You tell us your grinding problems. J. K. Smit engineers, located in all strategic cities, are trained and able to help you solve your job requirements.

We are proud of our reputation for integrity and ability . . . Our products reflect this reputation.

*Send for your copy of our latest Diamond Wheel Catalog or contact us direct for further information*

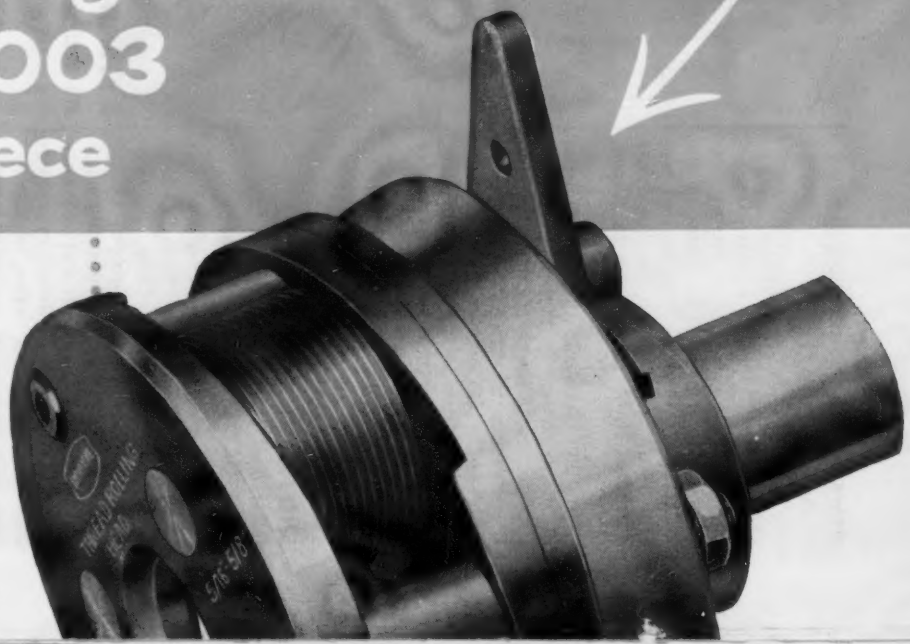


**J. K. SMIT & SONS, INC.**
HOME OFFICE AND PLANT
MURRAY HILL NEW JERSEY
215

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# Acme-FETTE

## Cuts threading costs to $0.00003 per piece



On an automotive part that required millions of *duplicate* pieces, one manufacturer found that the application of Acme-Fette thread rolling heads enabled him to:

1. Get required production with 9 Acme-Gridley bar automatics instead of 14.

**2.** Secure better threading results with rolled threads which provided smoother, tougher threaded pieces.

**3.** Show a unit threading cost of *3 one-thousandths of a cent.*

**4.** Reduce total cost per piece more than 33⅓% while producing in excess of 35,000,000 pieces.

*Why not check Acme-Fette advantages on your threading jobs?*




New Acme-Fette Type N self-opening thread rolling heads are used with either rotating or non-rotating spindles. They let you complete threaded jobs on your present turning equipment without rehandling — roll threads *5 times faster* than thread cutting methods (and with no chip problem).

# National Acme

THE NATIONAL ACME COMPANY, 183 EAST 131ST STREET, CLEVELAND 8, OHIO

SALES OFFICES: • Newark 2, New Jersey • Chicago 6, Illinois • Detroit 27, Michigan

cient operation of fire control units, automotive transmissions, machine tool drives, aircraft missile and rocket accessory power units, timing and various other devices.

In addition to its simplicity of operation and its extreme accuracy and uniformity in grinding hardened gear teeth, the grinder is claimed to reduce many costly and slow pre-forming and finishing operations formerly necessary in the production of precision gears. The demonstration showed how several precision gears may be ground simultaneously from solid blanks of metal, at rapid rates of speed.

The new grinder, developed after nearly seven years of research, is being employed as a long-needed essential new tool in the production of such precision gears as those used in airborne radar controls. These gears, it was explained by Sheffield engineers, must be turned out in volume to the accepted precision tolerances.

In addition to the gear grinder demonstrations, the visitors also were escorted on a tour of Sheffield's new Eli Whitney Metrology Laboratory.

★ ★ ★

## AUTOMATION BOOSTS DEMAND FOR SPECIAL TOOLS

While automation tends to increase standardization of products, it works the other way when it comes to the tooling used in automated lines. So much, in fact, that Wesson Multicut Company is erecting a new plant in Brighton, Michigan, just to take care of the skyrocketing demand for its special tools in automated industries. No standard tools will be produced at the

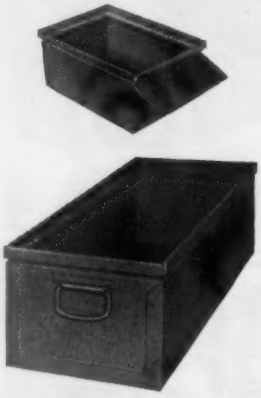

# HOW ARE YOU FIXED FOR BOXES?

Finding a place for production parts can be inconvenient and time consuming when boxes are unavailable.



For the best steel stacking box, its Sterling—its top rim construction makes it best.
Sterling makes all types and sizes of steel boxes.

**STERLING FACTORY EQUIP. CO.**
**183 Charles St., Providence, R. I.**



**Sterling**
*Quality Handling & Storage Equipment*

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A

# new freedom

## IN THE USE OF BEARINGS

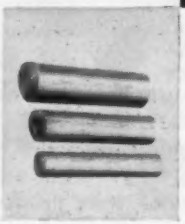




"Bunting Bearings" means fine bearings to machinery manufacturers, engineers and mechanical maintenance men. Bunting Cast Bronze is the outstanding metal in the field of general purpose bearing applications. Now the same high standards of manufacturing and distribution are available in a standardized line of Bunting stock sintered powdered plain and flange bearings, thrust bearings and bars.

You can choose the Bunting Bearing that exactly meets your need. Bunting Stock Cast Bronze Bearings and Bars are available in many hundreds of sizes for all mechanical requirements. Bunting stock sintered powdered self-lubricating Bearings are available in a far greater range of standard sizes than ever before. Each embodies traditional Bunting quality.








BOTH Bunting Cast Bronze and Bunting oil filled, self-lubricating sintered powdered Bronze Bearings and Bars are available to you through your nearest Bunting Distributor. He has in stock all sizes for your immediate needs. Ask him or write for complete lists and dimensional data on Bunting Cast Bronze and Bunting Sintered Bronze Bearings.

# Bunting®

**BUSHINGS, BEARINGS, BARS AND SPECIAL PARTS OF CAST BRONZE AND POWDERED METAL**

The Bunting Brass and Bronze Company • Toledo 1, Ohio • Branches in Principal Cities • Distributors Everywhere

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new plant. The Multicut plant is the fourth Wesson expansion in the past two years. Previous expansion moves included the new Wesson Metal plant in Lexington, Kentucky; a new Wesson Research Center in Detroit, Michigan; and the new Wesson Cutting Tools, Ltd., plant in Toronto, Canada.

## RACINE HYDRAULICS ACQUIRES NEW PLANT

Racine Hydraulics & Machinery, Inc., Racine, Wis., producer of portable rail saws, has announced the purchase of a new plant—known as Plant No. 2—of 25,000 square feet area for the manufacture of its expanding and growing line of railroad maintenance and power hacksaw equipment. According to a company official, Plant No. 2 will contain complete production, engineering, marketing, sales and office personnel. George Christiansen is new sales and marketing manager of Racine's Machinery Division. Other managing personnel, to be appointed in addition to Mr. Christiansen, will include Byron Langenfeld, chief executive; William Reinhardt, Jr., works manager; and Harold Miller, chief engineer.



George Christiansen


Pair of Profitmakers... these SCHAUER SPEED LATHES



*Polishing conical brass adapter with Schauer Type NAO Speed Lathe.*

These versatile, low-cost machines handle an almost unlimited variety of work—deburring, lapping, filing, trimming, polishing, etc. Thousands in use, *profitably!* Many sizes and models with holding devices to suit the job. *Speed your production* with Schauer Speed Lathes. Write for Catalog No. 530.

**SCHAUER MANUFACTURING CORP.**

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For every end milling operation there's a particular end mill that will do the job for you quickly, accurately and economically.

UNION offers a complete selection of top quality end mills in standard and special types to suit the requirements of your job.

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*Owners and Operators of:* S. W. CARD DIVISION, Mansfield, Mass.
BUTTERFIELD DIVISION, Derby Line, Vermont and Rock Island, Quebec

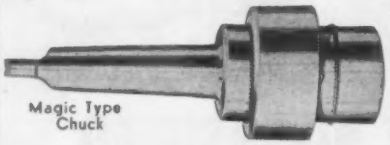
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## SUPERIOR BRASS ACQUIRES NEW DIVISION

It was recently announced that Kendrick Manufacturing Co., Detroit, Mich., has liquidated its business and that Superior Brass Works, Inc., Detroit, has purchased all of the machinery, equipment and inventory of Kendrick. Superior will continue the manufacturing operations of that company—as the Kendrick Division—at the Kendrick plant for several months, but will move operations to its own plant as soon as necessary alterations have been completed. Both companies make cast bronze bushings and bearings and sell to manufacturers of machinery and heavy equipment from coast to coast and in Canada. According to company officials, the joint sales of the combined companies total $2,500,000.00 annually, making Superior Brass Works, together with its new division, the third largest manufacturer of its kind in the United States.

Kendrick Manufacturing Company was formerly Thiery & Kendrick Manufacturing Company, founded in 1907. That company became Kendrick Manufacturing Company in 1927, with the late Horace Kendrick as president. Mr. Kendrick died in 1942 and Frank Bowles assumed the presidency, which office he has held to the present. Both Superior and Kendrick consist of bronze foundries and machine shops. As soon as the Kendrick Division production is transferred to the Superior plant as a second shift operation, the Kendrick equipment will be sold at auction.

Superior was founded in Detroit, Michigan, in 1918 as Superior Brass Works, with John Burke as its president. Mr. Burke continued in this capacity until he retired early in 1953. At that time, Superior Brass Works was acquired by Frank Langford and Donald F. Sexmith, the latter being vice president and general manager of the company. Messrs. Langford and Sexmith are formerly of Charlotte, Michigan, where Mr. Langford was the vice president and general manager of the Wilcox-Gay Corporation, and Mr. Sexmith served as plant manager in charge of production of this same manufacturing company.


THE COLLIS

MAGIC-TYPE CHUCKS

Reduce production costs with Collis Magic Chucks. Now tools can be changed without stopping or slowing down the spindle. Boring, counter boring, drilling, reaming, tapping, etc., can be performed practically continuously.

Let our 40 years of manufacturing experience help your customers select the proper equipment for the job.

*"Call Collis For Service"*

THE COLLIS CO.

Dept. A, Clinton, Iowa

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# MAY-FRAN CHIP-TOTE



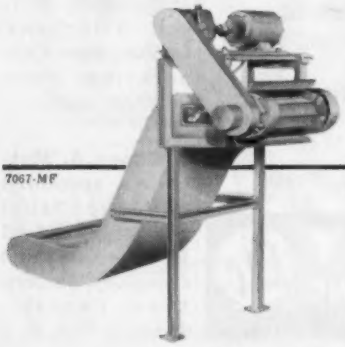
★ **Removes scrap automatically thereby eliminating machine down-time.**

★ **Reduces materials handling time and cuts operating costs.**

★ **STEP-UP PRODUCTION of machine tools . . . more production means greater profits!**

● No matter how you measure costs or profits . . . if you can reduce machine down-time, both figures will improve.

NOW . . . MAY-FRAN gives you the answer to manual scrap removal. Continuous removal of chips, turnings and borings from operating automatics or multiple spindle machines is possible with a CHIP-TOTE. Scrap is funneled onto the CHIP-TOTE hinged-steel conveyor belt and carried clear of the machine and then transported up an incline for discharge.



7067-MF

*There is a PAY-OFF for automatic scrap removal. Write today . . . ask for Catalog MF-640.*



**MAY-FRAN ENGINEERING, INC.**

1708 Clarkstone Road • Cleveland 12, Ohio

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***industry news in brief . . .***

**G. H. Rearick** named to the staff of W. J. Thomas, vice president, Tubular Products Division, **Babcock and Wilcox Company**, Beaver Falls, Pennsylvania. **Norman E. Wenzel** named plant manager. **Anthony D. Zar** appointed sales representative, in charge of the Milwaukee district sales office.

**Roy W. Benedict** appointed northwest district sales manager, **Clemson Brothers, Inc.**, Middletown, New York. His territory will cover British Columbia, Washington, Oregon, Idaho and Montana.

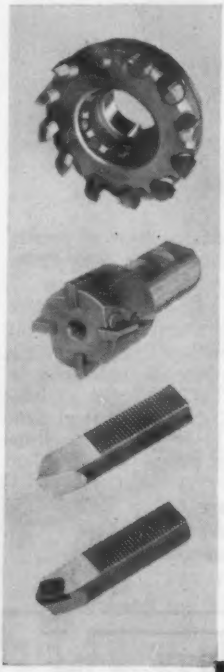
**Freas M. Long**, retired director of foreign sales for **Gisholt Machine Company**, Madison, Wisconsin, passed away recently at the age of 72. He retired on January 21st, 1955, after completing 48 years of service with the company, and was a member of the board of directors at the time of his death.

**Richard E. James, Jr.**, named manager of Indianapolis branch, **Thor Power Tool Company**, Aurora, Illinois. **John P. Bank** appointed sales engineer.

**Marlin R. Hemphill** appointed general manager of the forging and casting division, **Allegheny Ludlum Steel Corporation**, Ferndale, Michigan.

**Sidney A. Matthews** appointed machine tool analyst, **Standard Pressed Steel Company**, Jenkintown, Pennsylvania.


*Look into the complete, cost-cutting* **LOVEJOY** *line. Standard tools are in stock – to help you increase production, save time and money now!*



**INSERTED-TOOTH MILLING CUTTERS**

Face, side, end, slotting and boring mills.

**H. S. S., CARBIDE, ALLOY BLADES**

Interchangeable in all Type "A" milling cutters from 4½" to 24" in diameter.

**NEW! SET-SCREW TYPE END MILLS**

And new Type "Z" slotting cutters provide maximum axial and radial adjustment.

**Boring Tools · Arbors · Flywheels**
**Lovejoy Milling Cutter · Assembly Gage**

***Special cutters are a Lovejoy specialty***

Write for new catalogs: No. 31 (Face Mills), No. 32 (Side Mills), No. 33 (Arbors).

130 MAIN ST., SPRINGFIELD, VERMONT

*Send for free* **SPEED & FEED CALCULATOR**

**LOVEJOY TOOL COMPANY, INC.** Ltc
SPRINGFIELD, VERMONT, U.S.A.

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# GAGES by Card



# TAPS by Card

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Behind the manufacture of Card gages is specialized experience for over 80 years in producing the world-famous Card line of precision taps and dies. When you specify Taps, Dies or Gages by Card, you can be certain that you'll get top performance at low cost.

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## S.W. CARD MANUFACTURING CO.

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*Division of:* UNION TWIST DRILL COMPANY

TAPS • DIES • SCREW PLATES • GAGES

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## *industry news in brief . . .*

**Edward J. Shages** named vice president and manager of the cutting tool and gage divisions, **Pratt and Whitney Company, Inc.,** West Hartford, Connecticut. **James B. Wilkie** appointed manager of the gage division. **Earl R. Lewis, Jr.,** named production manager of the cutting tool and gage divisions.

**Interstate Machinery Company, Inc.,** 1431 West Pershing Road, Chicago 9, Illinois, appointed distributor in northern Illinois, **Greaves Machine Tool Company,** Cincinnati, Ohio.

**B. Harold Lewis,** New York district manager for the Grinding Machine Division, **Norton Company,** retired recently, after a Norton career of 41 years. **Frank H. Madigan** appointed district sales engineer for the New York area. **Kenneth L. Bates** appointed field engineer in the New England area.

**Quad Tool and Die Supply Company,** Merchantville, New Jersey, appointed distributor in the eastern Pennsylvania area. **The H. E. Dickerman Manufacturing Company,** Springfield, Massachusetts.

**Leo J. Rickes, Jr.,** appointed advertising and sales promotion manager, **Adamas Carbide Corporation,** Kenilworth, New Jersey.

**F. Weldon Munson** appointed director of industrial relations, **Dreis and Krump Manufacturing Company,** Chicago, Illinois.


# Deburrs 1520

## 1" TUBE ENDS PER HR. on PINES END FINISHING MACHINE



Here's another outstanding example of how the Pines No. 600 End-Finishing Machine is setting records for production speed and efficiency. Today, at Configured Tube Products Company, Bellwood, Illinois, the Pines Machine (shown at right) performs inside and outside deburring on 1" steel tubing at net production rates of 1520 tube ends per hour. Such high-speed production is made possible by the exclusive design of the Pines Machine which enables the operator to clamp and feed work to the rotating cutters in one pass, so that one hand is always free for rapid stock handling.

**Exclusive Features Speed Work**

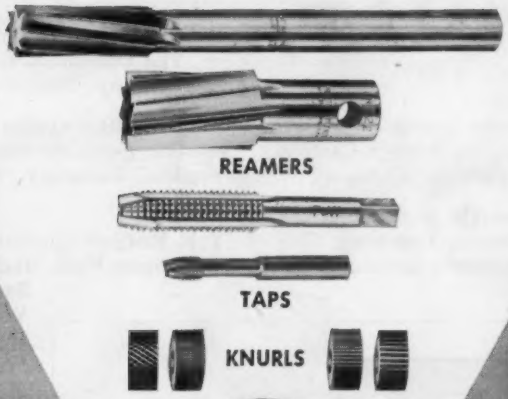
Still other outstanding Pines features such as quick, interchangeable tool holders, chuck inserts, 8-speed sheave (760 to 3920 rpm), sturdy spindle, and grease-sealed precision bearings assure fast, accurate work. The Pines No. 600 handles chamfering, pointing, facing, and reaming operations, as well as deburring, on stock diameters up to 2". Maximum feed stroke is 1-1/4". Automatic air-operated units for higher production work, and larger sizes up to 5" capacity are also available.

PINES ENGINEERING CO., INC.
Specialists in Tube Fabricating Machinery 644 WALNUT • AURORA, ILLINOIS
PRODUCTION BENDING • DEBURRING • CHAMFERING MACHINERY

FREE BULLETIN
Write for facts on how these machines cut production costs.



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CIRCULAR THREAD ROLLING DIES

CUT-OFF BLADES

*Screw Machine Cutting Tools*

**for the long run . . .**

**. . . because they run longer!**

MONOCONE DIES AND HOLDERS

DUOCONE DIES AND HOLDERS

Next time you buy Screw Machine Cutting Tools, remember it's not the purchase price but what you get for your money that really counts . . . how many pieces each tool will deliver *on the production line!*

In correct design and high quality, P&W Cutting Tools are your best buy anywhere. And you can select the tools you need — WHEN YOU NEED THEM — from on-the-shelf stocks at the P&W Branch Office near you.

**WRITE TODAY FOR COMPLETE INFORMATION.**

**PRATT & WHITNEY COMPANY**

INCORPORATED

**25 Charter Oak Boulevard, West Hartford 1, Connecticut**

*Branch Offices and Stocks in Principal Cities*

**MACHINE TOOLS • GAGES • CUTTING TOOLS**

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***industry news in brief . . .***

**Alfred D. Stevens** appointed assistant general manager, **Willey's Carbide Tool Company,** Detroit, Michigan.

**Richard Schoenfeld** has joined the **Lindberg Engineering Company,** Chicago, as administrative assistant.

**Robert A. Cole** appointed sales manager, **The Cincinnati Gilbert Machine Tool Company,** Cincinnati, Ohio.

**Paul N. Gillon** appointed manager of the basic research branch, **The Carborundum Company,** Niagara Falls, New York.

**T. E. Rodgers** appointed works manager, **Seneca Falls Machine Company,** Seneca Falls, New York. **V. L. Percy** appointed chief engineer and **R. M. Wheeler** made executive assistant.

**R. F. Meyers** appointed sales manager of the machinery manufacturing division, **The Motch and Merryweather Machinery Company,** Cleveland, Ohio.

**Birnie V. Edridge** appointed controller, **Henry Disston Division,** H. K. Porter Company, Inc., Philadelphia, Pa.

**Walter F. Cahill Company,** 19030 West McNichols Road, Detroit 19, Michigan, appointed exclusive representative, **The U. S. Drill Head Company,** Cincinnati, Ohio.

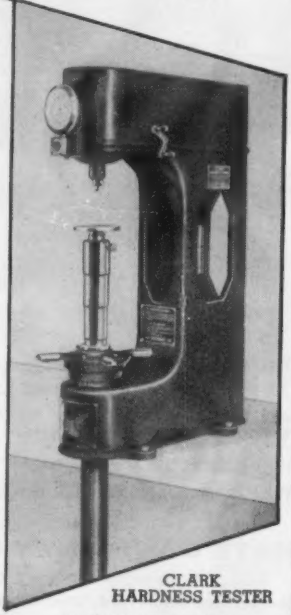

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TOMORROW'S ACCURACY TODAY

THE MOST FOR YOUR "ROCKWELL TESTING" DOLLAR!

The Clark Hardness Tester is precision built to give guaranteed precision results. Thousands of Clarks, with years of service all over the world, attest to this.

The surprisingly low price includes the precision Clark Diamond Cone Penetrator, as well as Steel Ball Penetrators, a wide assortment of Anvils, Test Blocks, and other accessories. Available in two models, for Standard and Superficial "Rockwell" hardness testing, each with choice of 8", 12", or 16" work capacity.

Before you invest in any hardness tester, get the facts about the low price, speedy delivery, and *guaranteed accuracy* of the Clark. Write today.



CLARK HARDNESS TESTER

CLARK INSTRUMENT, INC.
10204 FORD ROAD
DEARBORN, MICH., U.S.A.

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## star performer

## ... and among high speed steels

## REX is the leader

Crucible REX® high speed steel has been the winner in shop tests for more than fifty years. *And now REX is even better than ever!* For Crucible research and experience has led to improved manufacturing techniques that mean higher quality—greater uniformity.

Prove the superiority of REX for yourself—on your next job. Check it for size, structure, response to heat treatment, all-around tool performance. Then you'll know why REX has always been the *standard by which other high speed steels are compared.*

REX is immediately available at all of Crucible's convenient warehouses—or through prompt mill delivery. For a list of available data on REX and other Crucible *special steels,* write for a free copy of the "Crucible Publication Catalog." *Crucible Steel Company of America, Chamber of Commerce Bldg., 7th Ave. and Smithfield St., Pittsburgh 30, Pa.*

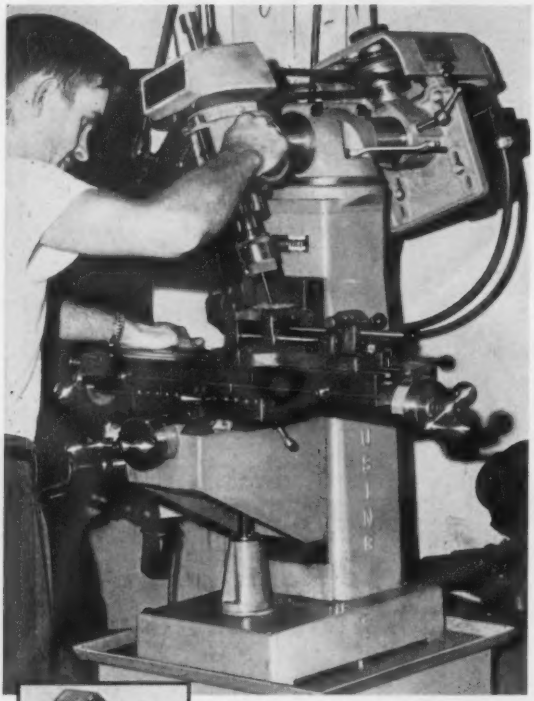
**CRUCIBLE** first name in special purpose steels

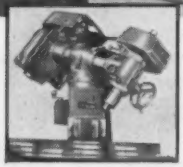
**Crucible Steel Company of America**

**Canadian Distributor—Railway & Power Engineering Corp., Ltd.**

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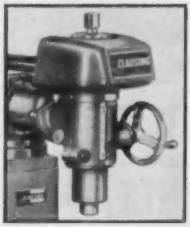
# "EXCEPTIONAL SENSITIVITY" with the CLAUSING VERTICAL MILL





The spindle head can be swiveled in a vertical plane and set at any angle, and turret rotated in a horizontal plane making it possible to mill, drill, bore, ream and shape at all angles with one set-up. Quill has micrometer depth control stop and two feeds, lever and hand wheel.

The heart of the CLAUSING MILL is its rigid, high precision spindle head. It has 7 ball bearings . . . spindle is chrome nickel steel, hardened and ground . . . quill, ground and hard chrome plated, has full-length honed bearing seat . . . overarm is an electric furnace casting, with ¾" thick walls, precision ground.



D & S Tool and Manufacturing Co., widely known for precision tool and die work, reports: "Our men prefer CLAUSING MILLS for die working. They have a sensitivity you don't get in larger machines that really pays off in accuracy and efficiency on every operation using small cutters, and the time they save in job set-ups is substantial."

## MOST ACCURATE MACHINE OF ITS TYPE and CAPACITY

Each CLAUSING Mill must pass these rigid tolerance tests:

1. Top of table perpendicular to column ways, both directions, within .0005" in 8" travel.
2. Table top, front to back, square with column ways 0 to .001".
3. Table, parallel to turret within .001".
4. Spindle square with table, front to rear, within .001" T.I.R. in 5" circle.
5. Spindle taper (internal) run out within .0002" at spindle nose.
6. Table T-slots parallel to table dovetail ways within .0005" in 8" longitudinal travel.

### CONDENSED SPECIFICATIONS

| | |
|---|---|
| Size of Table | 6" x 24" |
| Longitudinal Table Travel | 15" |
| Transverse Table Travel | 5" |
| Vertical Table Travel | 11⅛" |
| Maximum Distance Spindle to Column | 8¾" |
| Quill Travel | 3" |

Spindle Speeds: Six, 180 to 3250 RPM No. 7 Brown and Sharpe or No. 2 Morse Taper Spindle Optional. Operates from ½ or ¾ H.P., 1725 RPM Motor.

**MILLS, DRILLS, BORES, REAMS AND SHAPES *AT ALL ANGLES WITH ONE WORK SET-UP!***

***Write for* FREE LITERATURE**

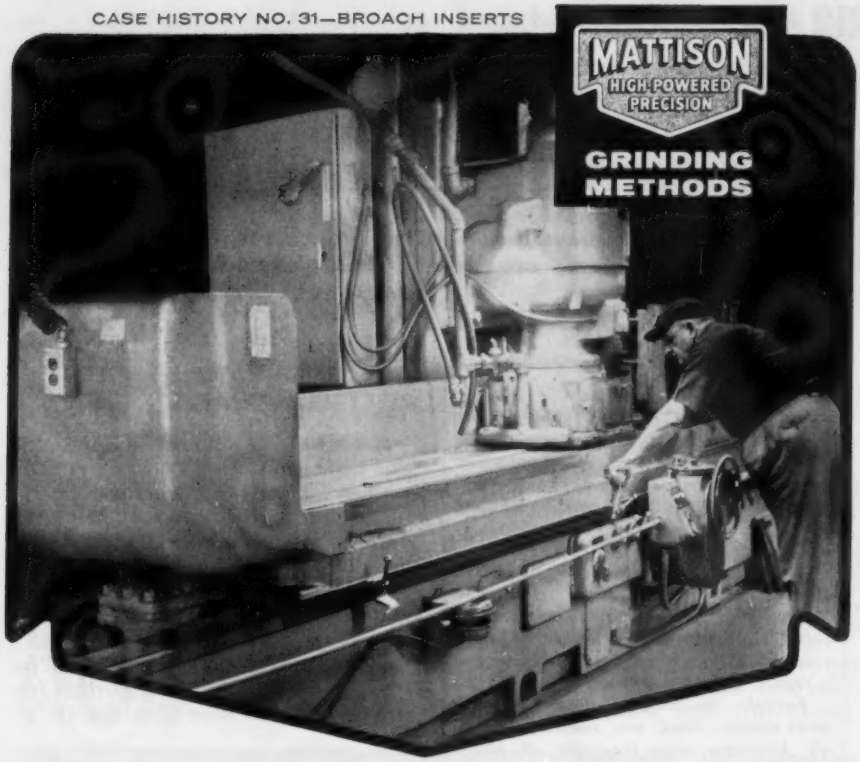
**CLAUSING DIVISION, *Atlas Press Company***

**10-110 NORTH PITCHER STREET, KALAMAZOO, MICHIGAN**

Atlas CLAUSING PRECISION MACHINE TOOLS — DIVISION ATLAS PRESS COMPANY KALAMAZOO, MICHIGAN U.S.A.

For more data circle 354 on Reader Service Card

CASE HISTORY NO. 31—BROACH INSERTS




## Switch from planers to Mattison Grinder cuts setup time, boosts production 350 per cent!

Broach inserts, formerly planed, are ground on the Mattison No. 400 Vertical Spindle Reciprocating Table Surface Grinder. Production has been increased because this heavy, powerful machine removes so much stock, milling time has been reduced. Former production was 200 inserts per week on the planers—today inserts are ground at the rate of 700 per week (a 350 per cent boost). Whereas setup time was 45 minutes per load, today it takes only 15 minutes to set up and grind 20 pieces. Check savings on your jobs by sending parts to Mattison for free sample grind and production estimate.

**Mattison Machine Works, Rockford, Illinois, U. S. A.**



Mattison high-powered Surface Grinder also is used for grinding large 60 in. clamping fixtures for the toolroom.




For more data circle 355 on Reader Service Card

# new shop equipment

new shop equipment

***Descriptions of new machines, tools and materials for metalworking.***

## Gaging the News

*Heat treating metal stock and parts has come a long way since the days of the 'ole village smithy. In recent years, heat treating equipment manufacturers have introduced a multitude of new furnaces, some of which offer fully automatic processing. One of the most interesting trends has been the move to using small compact units in metalworking shops. In many cases metal heat treating has now become a regular part of shop procedures.*

*Basically the furnaces are divided into three classifications: gas, electric and fuel oil. Efficiency wise they are all about equal. But one type over another may prove to be more practical depending on the job. Applications include heat treating previous to machining or treating parts after machining or both.*

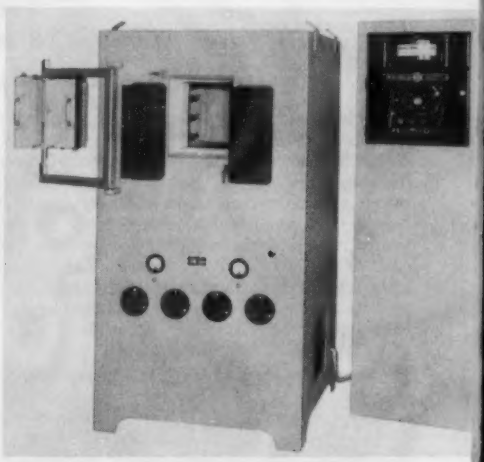
*The new furnaces are a result of the manufacturers' constant research, testing and development plus one other potent factor, namely, they know more about metals than they ever knew before—their strengths, weaknesses and limitations. Hence they now know how to treat them more effectively. The basic problems have been solved: ways to maintain high temperatures, means to control atmospheres inside the furnaces and finding furnace materials that withstand the heat.*

*Using this equipment in shops cuts costs, saves manhours, reduces waiting time and gives production men a potent tool for keeping abreast of production schedules.*

### HIGH TEMPERATURE SERIES ELECTRIC FURNACES

L & L Manufacturing Co., 136 Eighth St., Upland 71, Del. Co., Pa., has announced a series of electrical heated furnaces to 2,500 degrees F. and 2,750 degrees F. Special silicon-carbide nonmetallic heating elements are used for long trouble free life.

Unique features include specially engineered circuits for long life and a wide selection of voltage adjustment for long life of elements. An important feature is that the door openings are al-



*L & L High Temperature Electric Furnace*

ways the advertised height and width of the firing chamber. The firing chamber dimensions are not altered by the addition of baffles for the interior of the furnace which can be installed to reduce the effects of radiation from the silicon-carbide heating elements.

Case construction is of heavy sheet steel. All units are of floor type construction and transformers, contactors and temperature controls are installed in the base of the unit except special controls which require a special instrument panel. Another unique feature is that at extra cost control over the firing chamber gradient can be easily attained for extremely critical heating procedures. Insulation is of multi-layered type utilizing the newest developments in this field.

For more data circle **75** on Reader Service Card

★ ★ ★

## SIMULTANEOUS BORING OF DIFFERENTIAL HOUSING FLANGES

The Heald Machine Co., Worcester 6, Mass., has announced a machine called the Model S Bore-Matic for precision borizing both ends of an automotive differential housing.

It is said that while boring operations are being done simultaneously 50 inches apart, tolerances and concentricity are held to close limits. The design of this machine makes it possible to machine both ends of the part at one clamping.

Another notable feature of this machine is the use of feed-out tools to eliminate tool drag line or spiral normally present in one-way boring operation. Air operated push rods working through hollow boring head spindles advance tools to correct position for in-boring and retract tools prior to table run-out, eliminating the necessity of boring out to avoid drag line.

Surfaces borized are bearing and oil seal diameters and adjacent chamfers. With 0.015 stock removal, diameters are held to a tolerance of 0.002. Production based on a 70 per cent efficiency is 36 housings per hour.

A hydraulic unit mounted at the rear of the machine provides all power for the horizontally opposed slide units which carry tooling to the workpiece.

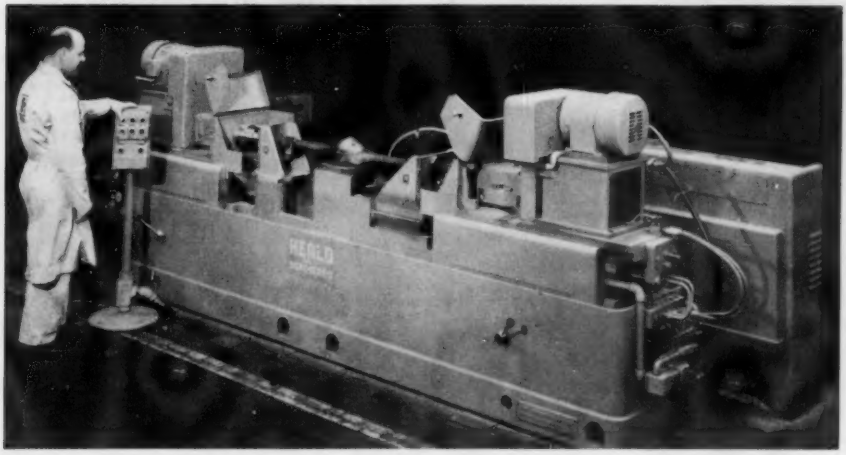



*Illustration of Heald Model S Bore-Matic for boring differential housing flanges*

Except for loading operations, all machine functions are controlled from push button station.

For more data circle **76** on Reader Service Card

★ ★ ★

## DIE CASTING MACHINE

The Cleveland Automatic Machine Co., 4940 Beech St., Cincinnati 12, Ohio, has announced its advanced Model 600 die casting machine. Many interesting features are included on this machine which make it a fast productive machine, easy to operate and one requiring a minimum amount of maintenance. Included in these features is the locking pressure which is strain gauge tested. Therefore, this full rated machine will lock dies securely and produce castings with a minimum of flash.

Other features include modern hydraulic circuit with manifold construction with all tubing over 1 inch having flanged fittings welded to the tubes to reduce maintenance. A 30 h.p. motor drives two Vickers pumps which deliver 99.7 g.p.m. This high pump capacity results in a fast cycling machine. A 200 gallon hydraulic reservoir and filter capacity is supplied, which is double the pump output. This is provided to insure maximum pump life.

The massive die plates are cut from solid steel blocks to decrease deflection to a minimum, and four large diameter high carbon steel tie bars add rigidity and resist stretching under locking pressure. Each tie bar is deep hole drilled and can be supplied with indicator rods and indicators for even distribution of locking pressure load. The husky cast steel toggles and hardened steel toggle pins and bushings maintain pressure when die is closed. Automatic lubrication is provided and insures safe lubrication of all wear points.

The completely universal, automatic timing control panel provides all desired cycles for successful die casting and insures uniform castings of the highest quality. This main electric panel is roomy and remote from machine, thus, separating electrical controls from the vibration of the machine. Push buttons necessary for set-up and operation are located within easy reach of operator.

For more data circle **77** on Reader Service Card

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## HOT STAMPING MACHINE FOR MARKING PRINTED CIRCUITS

Phenolic plates with copper circuits are marked in color with circuit identi-

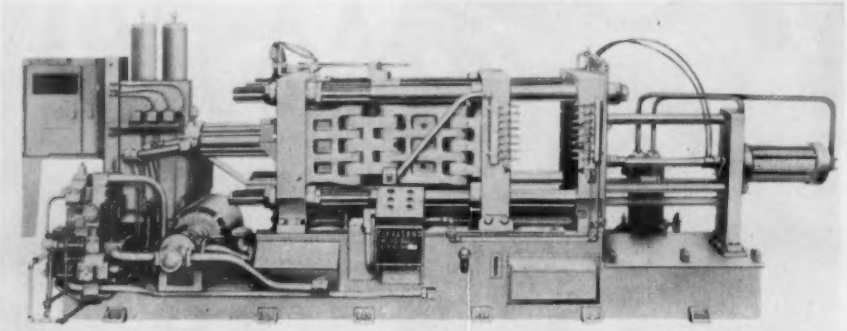


*Illustration showing an overall view of the Cleveland Model 600 Die Casting Machine*

# SHELDON

CHICAGO U. S. A.

## BUILT • • • to Turn out PROFITS

**Sheldon Lathes are designed and built to do accurate lathe work rapidly and profitably. Moderate in price they have the collet, swing and power capacity to do most toolroom work.**

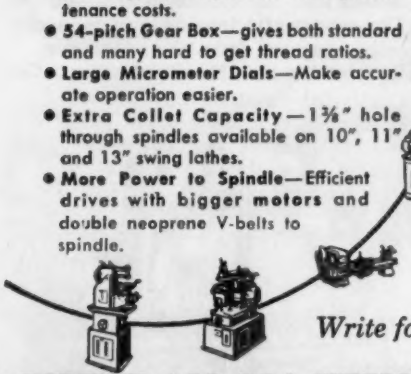


UM56P
13" Swing Lathe
34" Between Centers
Rapid Shifting "U" Drive

UM56P
$1615.00
Base Price
F.O.B. Chicago

### *Design Features:*

- **Large and wide "Zero Precision" Tapered Roller Spindle Bearings**—permit operation at all speeds, retain accuracy, end expensive bearing maintenance costs.
- **54-pitch Gear Box**—gives both standard and many hard to get thread ratios.
- **Large Micrometer Dials**—Make accurate operation easier.
- **Extra Collet Capacity**—1⅜" hole through spindles available on 10", 11" and 13" swing lathes.
- **More Power to Spindle**—Efficient drives with bigger motors and double neoprene V-belts to spindle.



**OPTIONAL FEATURES AT EXTRA COST** include: Hardened ways, Long Tapered Key Drive Spindles, 4" D1 Camlock Spindles bed turrets, collet attachments, and other production and toolroom accessories. Lathes available with a choice of "Bench," "Cabinet" or "Pedestal" mountings.

*Write for New Catalog G-55*




## SHELDON MACHINE CO., Inc.

**4230 N. Knox Ave. • Chicago 41, Illinois**

For more data circle **356** on Reader Service Card

SUPERBORE

3 SIZES

1/64" OVERSIZE
1/32" OVERSIZE
STANDARD SIZE

Counterbores

NEW!

30° Right Hand Spiral, 4 Flute

Now you can speed up production 100% with our *New* 30° fast right hand spiral, four-flute counterbores.

You will find that faster feeds are possible with this freer-cutting tool.

Hardened counterbore blanks in stock can be ground to any special pilot and flute diameters in one week.

Complete Reamer catalogue with world's Greatest Reamer selection by the Thousands' and thousandths. Write for it today!

TWENTIETH CENTURY MANUFACTURING CO.

ROUTE 176 and BRADLEY ROAD
BOX 429-M, LIBERTYVILLE, ILL.

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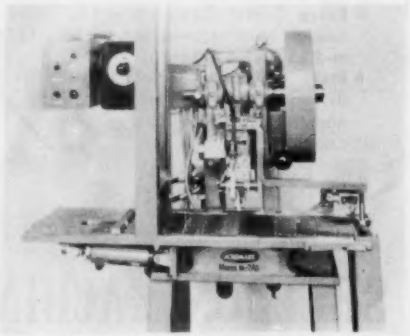


fication or assembly numbers in an adaptation of the Model No. 9AS hot stamping press announced by the Acromark Co., 9 Morrell St., Elizabeth, N. J. It is provided with a pre-set counter for any desired number up to 1,000. The machine then counts, marks and ejects automatically all circuit plates placed in the magazine. The ejector in turn replaces the marked plates in another magazine, all in perfect sequence.

The speed of the machine is rated at 3,600 marked plates per hour. Control is by means of the hand latch for continuous or intermittent operation at the will of the operator. The magazine has a friction drive and the ejector is of force feed type. In the actual operation, the number of plates to be marked are simply placed in the magazine, the counter is set for that number then the hand latch release is pressed. The machine hot stamps any desired lettering and consecutive number in color.

The control box shows a red light when count is reached, pilot light and switch for heater with control, motor switch and the feeding circuit button. The pneumatic feeding unit is electrically operated from the press ram.

For more data circle 78 on Reader Service Card



*Acromark Model 9AS Hot Stamping Press*

# MOTCH & MERRYWEATHER
## CUT-OFF BLADES
## and
## SLITTING-SLOTTING SAWS




**STOCKING DEALERS in all principal cities.**

**FACTORY-APPROVED SERVICE in many industrial centers.**

**ENGINEERING SERVICE to solve your specific problem.**

Challenge Motch & Merryweather to demonstrate that the Triple-Chip Method will cut off stock in faster time, with greater precision, and at lower cost than any other method. Rely upon Motch & Merryweather to engineer your job, recommend the right blade, and follow through. Our wide range of blades and saws is coupled with a wealth of technical experience and data on every phase of the circular sawing of all metals. Motch & Merryweather sales engineers in conjunction with dealers nation-wide stand ready to analyze your exact requirements and recommend a complete, profitable solution. Ample, strategically located stocks insure satisfactory delivery.

• • •

Also Kroslok Face Milling Cutters and Shell End Mills. Also Triple C Grinding and Cutting Coolants and Machine Cleaner.

**THE MOTCH & MERRYWEATHER MACHINERY CO.**

Cutting Tool Manufacturing Division

1250 EAST 222nd STREET, CLEVELAND 17, OHIO

TRIPLE-CHIP CIRCULAR SEGMENTAL AND SOLID CUT-OFF BLADES • TRIPLE-CHIP SLITTING SAWS • KROSLOK FACE MILLING CUTTERS AND END MILLS • TRIPLE C GRINDING COOLANT • TRIPLE C MACHINE CLEANER • TRIPLE C CUTTING COOLANT

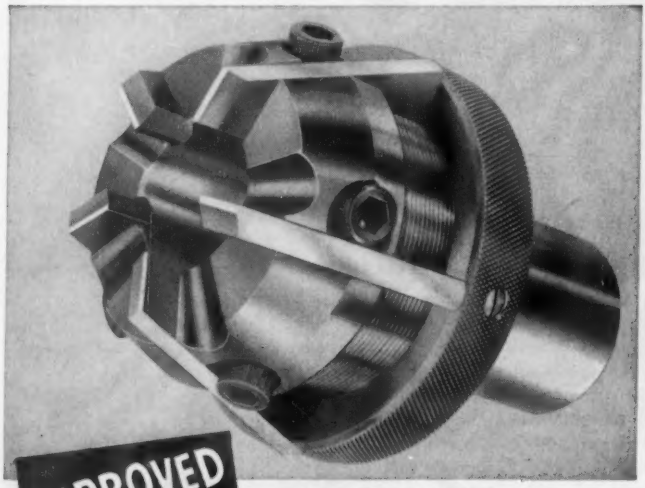
For more data circle **358** on Reader Service Card

*new shop equipment . . .*

## MULTI-USE ELECTRIC FLOATING DISC CLUTCH

Carlyle Johnson Machine Co., Dept. MM-5, Manchester, Conn., has designed and marketed a simple and practical electric clutch embodying the company's standard Maxitorq floating disc clutch units, either wet or dry type. Production of the new electric floating disc clutch is available in a full range of standard sizes, both single and double types. Production models of the clutch represent a proved design that has been thoroughly service-tested on a wide range of installations.

The clutch consists essentially of a sealed magnetic coil enclosed in the clutch housing and acting through a sleeve and pressure plate to compress the clutch discs. An important design feature is that the electro - magnetic actuating mechanism is stationary. Positive pressure is exerted and maintained on the clutch discs entirely by means of the magnetic flux, and there is no mechanical contact between the moving and stationary parts. Consequently, there is no wear on these parts of the assembly. At the same time, the entire mechanism is essentially self-adjusting and self-compensating for wear up to the point where the standard Maxitorq clutch disc-pac normally becomes due for replacement. The action of the new clutch in combination with the character-

IMPROVED

**GENESEE**
**Adjustable Hollow Mill**

**There is a size and style Genesee for every hollow milling job. Standard sizes from 0 to 2″, standard with straight or Morse Taper shanks carried in stock.**

- Quick — easy adjustment
- Simple sharpening method
- High speed steel—cast-alloy —Carbide tipped blades
- Let our Engineering Department solve your Production tool problems

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**GENESEE MANUFACTURING COMPANY**
566 HOLLENBECK ST. • ROCHESTER 21, N. Y.
Adjustable Hollow Mills • Facing and Counterboring Tools • Special Production Tools

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# NEW

# BESLY CARBIDE TOOLS

## for increased cutting efficiency

**BESLY** TOOL HOLDERS and THROWAWAY CARBIDE INSERTS



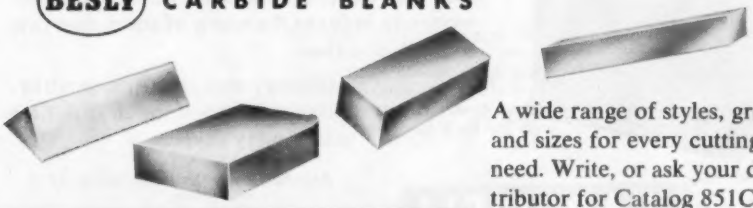

Milled Type

Broached Type



A *complete* line of holders and triangular or square throwaway carbide inserts. Write, or ask your distributor for Catalog 852C.

**BESLY** CARBIDE BLANKS



A wide range of styles, grades, and sizes for every cutting need. Write, or ask your distributor for Catalog 851C.

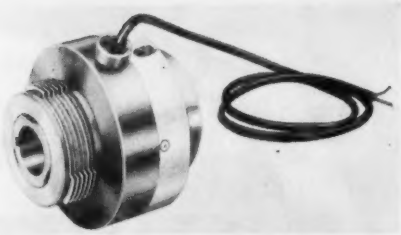
**BESLY** **BESLY-WELLES** CORPORATION

Est. as Chas. H. Besly & Co., 1875

108 Dearborn Avenue • South Beloit, Illinois

For more data circle 360 on Reader Service Card

istics of the floating disc design assure instant, positive engagement and disengagement, where this is desired, to a point beyond the rated load-carrying capacity of the units. Another important feature of the new design is that the magnetic flux and, in consequence, the pressure exerted on the clutch discs, can be precisely controlled by varying the voltage. The electric clutches, therefore, open up a wide range of new application possibilities where it may be desirable to pick up or slow down a load gradually from a remote station. Other applications include use as a "dead man" type of control in conjunction with safety devices. Fully controllable positive action, combined with compactness and simple wiring, suggests broad use in automated equipment installations.



*Johnson Maxitorq Electric Disc Clutch*

The clutches can be furnished with either steel discs (usually running in oil) or with standard bronze-faced discs for dry applications. In either case, the operation is equally efficient. The clutches use standard disc-pacs, driving cups and rings, and their installation follows normal clutch assembly practice. Since the electrical parts do not revolve, there are no complicated collector rings or brushes, and the electrical connection is simply made to the





**PAYS FOR ITSELF**

***Time and Time Again***

Wardwell's 57 T, Circular Saw Grinder, will sharpen as many as 250 Milling Cutters, Slitting and Screw Slitting Saws .015" thick at one time with a variation, plus or minus .001" of exact diameter for entire lot. Automatically indexes the gang of saws, one row of teeth at a time.

Steady, accurate, durable. Grind either wet or dry. A time and money saver.

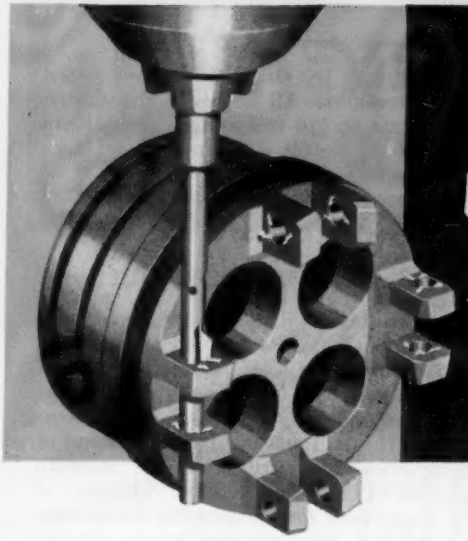
***Ask for Bulletin describing 57 T***

**WARDWELL MANUFACTURING CO.**

**3803 Ridge Rd., Cleveland 9, O.**

**Maker of Largest Line of Saw and Tool Sharpening Machines**

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# HERE IS THE "HOLE" STORY

## COGSDILL BURRAWAY TOOLS

For burrs, fins, and other irregularities, both top and bottom of machined holes the simple action of the BurrAway double-edged cutter blade, controlled by a spring-loaded plunger, completely deburrs any hole or series of holes in line in one quick "in and out" operation..

For high-production applications requiring different depths of chamfer on top and bottom, the BurraMatic tool offers separately adjustable cams for depth control on both faces. For specific applications of the BurrAway or BurraMatic tools contact our engineering staff for details.




**Cogsdill TOOL PRODUCTS, INC.**

**12980 W. Eight Mile Road, Oak Park 37, Michigan**

For more data circle **362** on Reader Service Card




**Errington specializes in the manufacture of high speed multiple drilling and tapping attachments. The name Errington is your assurance of top-quality products . . . your assurance of the finest and most modern tools to produce first-grade workmanship at minimum operating costs.**

**QUICK-CHANGE**
Tool-Holders to Drill, Tap and Set Studs, etc., without moving work, or stopping or reversing machine. Individual friction adjustment in each tap-holder, if required.

**POSITIVE**
For through holes where work is drilled and then re-handled and tapped.

**BALL BEARING CONE-DRIVE**
Designed for Ball Bearing High Speed Drill Press.

***These Tappers may also be adapted for button or acorn die threading.***

***Write for Complete Information***

**ERRINGTON Mechanical Laboratory, Inc.**
*Established 1891*
Main Office and Plant: **STATEN ISLAND 4, NEW YORK**

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housing of the clutch (as shown in the illustration). All sizes of the clutch operate on 110-volt house current, rectified to 90-volt d.c. current and consume 80 watts.

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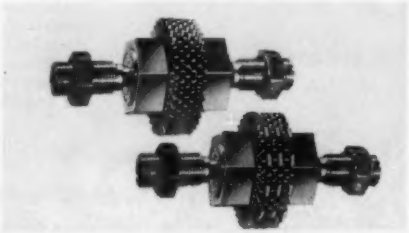
★ ★ ★

## DRESSER CUTTER ASSEMBLIES

For better dresser performance at lower cost, the Besly-Welles Corp., 108 Dearborn, S. Beloit, Ill., has announced its advanced functionally designed Type A "Wise" dresser cutter assembly. It lasts longer and picks, instead of crushes, the surface of the abrasive disc. These features, in addition to economical price, provide lower cost abrasive dressing, according to the manufacturer.

Two types of cutting wheel assemblies (as shown) are interchangeable on the same basic arbor, giving this dresser broader application possibilities for longer service life and better results. The "standard" type has a cutter blade assembly made up of six wheels with all fine teeth. This is particularly suitable for dressing softer abrasive discs. The Type A has three wheels with fine teeth and three wheels with alternate fine and broad teeth. It is ideal for dressing hard abrasive discs.

The fine teeth on both styles of dress-



***Views of Besly-Welles "Wise" Dresser Cutter Assemblies, top, Standard; bottom, Type A***

# NEW EXCEL No. 7A 6x12 SURFACE GRINDER

## *Big machine features . . . yours at LOW COST*



- Elevating Handwheel located **below table level.** Operator can simultaneously see floating vernier dial pointer and grinding wheel as it contacts the work. No reaching over head.
- Hard Chrome Table Ways insure **long lived accuracy,** do not have to be re-scraped periodically.
- Precision Thread Ground Lead Screws are made from a special long-wearing lead screw steel.
- Smooth Timing Belt Drive contributes to smoother grinding finishes. No rack and pinion. No lubrication needed.

Ideal for tool room work, rugged enough for many production jobs, you'll find the No. 7A a **profitable investment** even if you use it only part-time. Write or phone for full details.

**OVEL PRECISION GRINDERS** | **BENTON HARBOR, MICH., DEPT. M-106**

**HYDRAULIC & HAND FEED SURFACE GRINDERS • UNIVERSAL CUTTER & TOOL GRINDERS • DRILL GRINDER**

For more data circle **364** on Reader Service Card

er assemblies pick abrasive grain from the surface. This sharpens without changing the grinding characteristics. The manufacturer states that the broad teeth on Type A prolong the life of the dresser cutters.

Another unique feature of the Wise Type is the tru-square arbor. The square design overcomes one of the chief disadvantages of other cutters which tend to chew the keyway holding them on the arbor spindle and wear out the spindle long before the cutter itself is worn out.

Almost frictionless rotation of the cutter assemblies is assured by sealed ball bearings holding the squqare arbor. Buttons pressed into the side of each individual cutting wheel eliminate the need for spacing washers, and speed assembly and replacement.

For more data circle **80** on Reader Service Card

★ ★ ★

## IDENTIFICATION NAME-PLATE PRESS

A compact machine for stamping individual letters and numbers on all types of identification plates and tags has been announced by the Clearview Co., 172 Stanton St., New York 2, N. Y. The nameplate press is a carefully designed marking machine for stamping special code numbers and information on permanent identification plates and tags which are then attached to property and equipment. For example; tables, chairs, machinery and typewriters. This machine can also be used for scores of other identification purposes in every industry for marking on keys, toolroom tags, bath house tags, nameplate badges for personnel, storage bin tags, inventory tags and various other applications.

For more data circle **81** on Reader Service Card

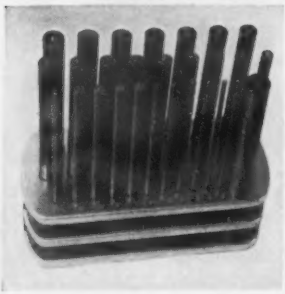




Dowel — Straight
Countersunk — Taper
Made to Blueprint
CENTERLESS GROUND
TO ± .0001" ACCURACY
.010" to .125" Diam.
.125" to 2." Length
Complete Centerless Service
Since 1931

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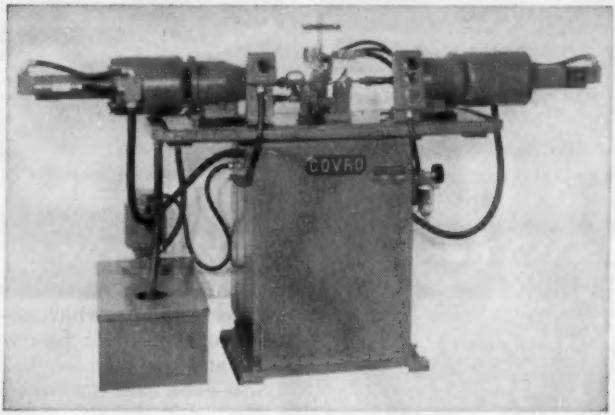
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SPELLMACO "SPOTTERS"
A matched set of transfer punches
for toolmakers, machinists & tool cribs
Used for transferring location of threaded, drilled and reamed holes, slugs, blanks, etc.
Precision made of finest tool steel—Carefully heat treated and tempered for long life—.0025 undersize to facilitate use—Black oxide finish.
SET #3-17; 28 punches with indexed stand—sizes 3/32" to ½", by 1/64"—plus handy 17/64" size. Length 4⅞". ONLY $17.90.
*Single sizes available.*

R. L. SPELLMAN CO. • URBANA, OHIO

For more data circle **366** on Reader Service Card




# NEW AUTOMATIC CENTERING MACHINE

A way to perform centering operations at a high production rate has been developed in this new machine which incorporates two Govro-Nelson Automatic Drilling Units and was specially designed for centering a marine motor cam shaft.

The operator loads the part into a fixture and depresses the start cycle switch, whereupon the work is automatically clamped, centered at both ends and unclamped, ready for the operator to remove. Output rate: Approximately 360 pieces per hour.

If you have similar operations and would like to speed up your production rate, we shall be pleased to recommend the proper Automatic Units or quote on a complete set-up. Complete information sent upon request.

WRITE FOR *Literature*

**GOVRO-NELSON CO.**

*Machinists of Precision Parts for 33 Years*

**1933 Antoinette**
**Detroit 8, Mich.**

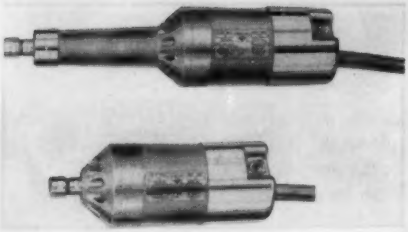
*Automatic* **DRILLING UNIT**

For more data circle **367** on Reader Service Card

*new shop equipment . . .*

## DIE GRINDERS PERMIT USE OF LATEST HIGH SPEED BURRS AND POINTS

To enable toolrooms and die-shops to capitalize on the latest developments in high-speed burrs and mounted points, Millers Falls Co., Greenfield, Mass., has introduced four models of its No. 320-high speed die grinder.



*Millers Falls High Speed Die Grinders*

These grinders, which now provide a full range of units for modern toolroom and die-shop needs, are in two styles—long nose (overall length 11¼ inches) and snubby nose (overall length 7¼ inches)—and each is available in two speeds—20,000 or 30,000 r. p.m. This choice of speeds and nose designs permits selection of the model exactly suited to each particular job.

These grinders are ideal for all hand operations as well as for many applications using special jigs and fixtures. Lightweight and compact, they are powerful, cool-running, and vibrationless. Fine balance and small diameter make them exceptionally easy to control. Chucking capacity on all four high speed grinder models is ⅛ to ¼ inch. The precision collet chucks allow burrs and mounted points to be held close to the bearing.

Each grinder comes packed in a steel carrying case with hinged acces-


**SUPERIOR INDICATOR**

***A Low-Priced Dial Type Indicator***

Has 2 contacts 1/32" threaded within ⅛". Double Faced. Reads front and back. Two Crystals. Double faced dial indicator complete with plated holder including 1/32" and ⅛" contacts —

Superior Indicator #50....$8.95
Superior Indicator #75X with Universal Swivel..$10.95

Thousands of satisfied customers!

**SUPERIOR INDICATOR CO.**
P. O. Box 734, Rochester 3, N. Y.




For more data circle **368** on Reader Service Card



**Put Muscles In Your Lubricants**

**MOTOR MICA**

**ANTI-FRICTION COMPOUND**

A clean white powder. Improves cutting oils. Dies last longer. Solves tough lubrication problems. Ask for free sample.

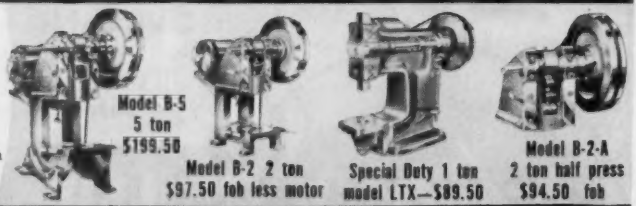
**SCIENTIFIC LUBRICANTS CO.**
**3469 N. Clark St. Chicago 13, Ill.**

For more data circle **369** on Reader Service Card

**Heavy Duty Bench Type ALLEN Punch Presses**

**Powerful, Dependable and Economical**
**Many Popular Models**
**1 to 5 Ton Capacities**
**Moderate in Price**

See your Supply Dealer or write for FREE Punch Press Catalog giving complete information.




**ALVA ALLEN INDUSTRIES, Dept. MM, Clinton, Missouri**

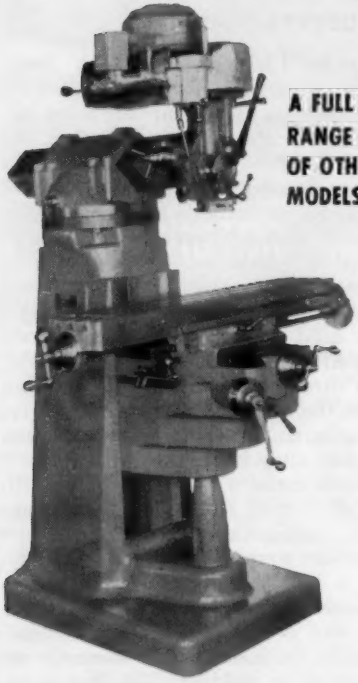
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LIKE A "45" AUTOMATIC



# this NEW "45" INDEX MILL

has the "CALIBER" and "ACCURACY" to do your MILLING, DRILLING and BORING JOBS .. BETTER, FASTER AND MORE ECONOMICALLY!



A FULL RANGE OF OTHER MODELS.

The big caliber derives from the sliding overarm—The unique square design of this overarm gives much more rigidity with its resultant greater accuracy—It provides extra range and capacity—More usable working space—More versatility in set-up—More power at the cutter. No adjustment required on overarm and head after use, and no need to re-indicate head after moving overarm. Speed range with 9 changes makes possible the use of high speed or carbide tipped cutters to the best advantage. Many other important features.

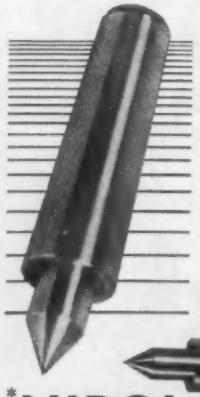
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## INDEX MACHINE CO.

544 N. MECHANIC STREET JACKSON, MICHIGAN

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SPRING LOADED
LIVE CENTER



Eliminate excessive overhang of your center. Use the accurate, rugged, reliable *NIROL. The spring loaded Live Center that compensates for expansion and contraction in actual operation.

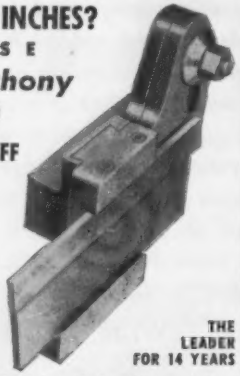
*Write for complete information.*

*Reg. U.S. Pat. Off.

*NIROL MANUFACTURING COMPANY
901 H'WAY 22, N. PLAINFIELD, N. J.

For more data circle 372 on Reader Service Card

CUTTING STOCK DIAMETERS UP TO 40 INCHES?
USE
*Skee-Anthony*
(PATENTED)
CUTTING OFF TOOLS
for . . .
★ BORING MILLS
★ LATHES
★ PLANERS
★ SHAPERS



THE LEADER FOR 14 YEARS

Patented Pivoting Trunnion, Safety-Slip and Support Blade prevent blade breakage and injury to operator. Fast adjustment to lathe center.
*Write for free descriptive folder A-1*

SKEE TOOL COMPANY
1406 N. FLORES ST.
SAN ANTONIO, TEXAS
• Few Industrial Areas Open for Representatives •

For more data circle 373 on Reader Service Card

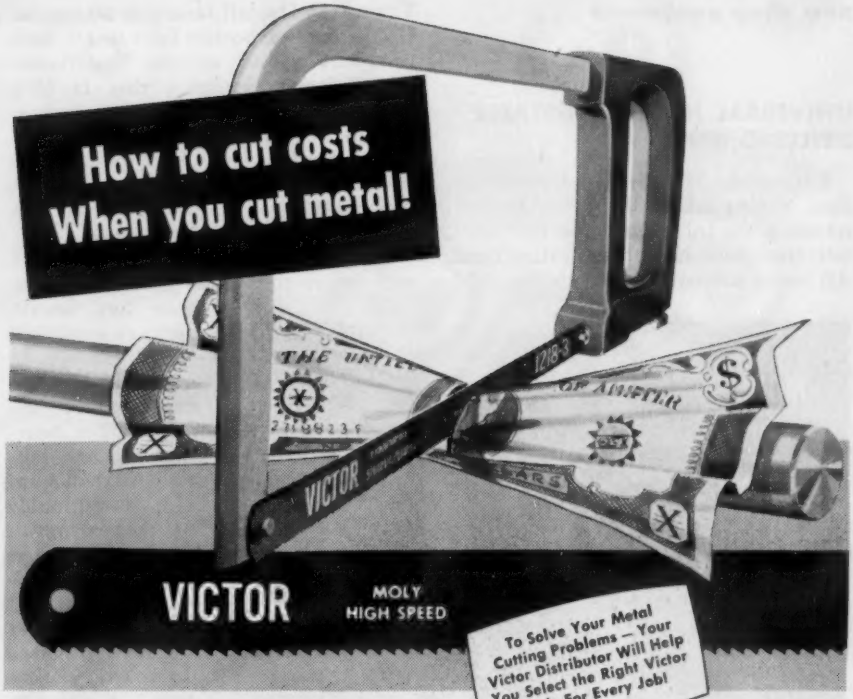

sory tray and locking cover, complete with one ⅛ inch arbor, one each ⅛ inch and ¼ inch collet chucks, one ⅜ x ⅜ x ⅛ inch grinding wheel, two chuck wrenches, and ten feet of rubber-covered, three-wire cord with moulded-on plug. A lathe adaptor for the long nose models is also available.
For more data circle 82 on Reader Service Card

★ ★ ★

## HARDSURFACING FLUX

Lincoln Electric Co., Dept. 3507, Cleveland 17, Ohio, has announced an addition to its line of hardsurfacing agglomerated alloy fluxes. The flux, H-560, is used with the submerged arc welding process to produce a hardsurfacing deposit using a mild steel electrode. It is an agglomerated mixture of fluxing materials and alloys which will produce a high carbon, high alloy weld deposit when used with the company's L-60 mild steel automatic electrode wire. Alloys are added to the weld deposit through the flux. Agglomeration bonds the flux and alloy particles together, each H-560 particle containing flux and alloy in proper proportion.

It will make a deposit with a hardness of 53 to 61 Rockwell RC that cannot be torch cut or forged. The deposits will resist scaling and flaking and retain a highly polished surface when subjected to metal friction. The hardness and abrasion resistance is unaffected by the cooling rates normally encountered in welding. The flux is excellent for the fabrication and maintenance of wearing parts where the service involves severe abrasion and medium impact. It will perform successfully under abrasive conditions at temperatures as high as 1100 degrees F. and has many industrial applications.
For more data circle 83 on Reader Service Card




**No magic — just common sense! *Victor* Saw Blades are Better Blades — Do the Job Faster, Easier . . Last *Longer!***

Always specify Victor Blades for hand and power saws. It won't take long for you to see the difference . . . on the production line *and* on the cost sheets!

Because Victor Blades are made better — to give you what you need for efficient, low-cost, high-speed operation. Victor Blades provide uniformity, proper hardness, efficient tooth design . . . *plus* the convenience assured by ample set for clearance and clear, easy-to-read markings. These things add up to the reason why Victor is the best blade buy — everywhere!

**REMEMBER THESE 5 VITAL COST-CUTTING POINTS WHEN YOU ORDER SAW BLADES:**

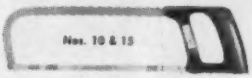
1. **UNIFORMITY** — Quality must be consistent . . . in *every* blade.
2. **HARDNESS** — Blades must be heat treated and tempered to the proper degree.
3. **EFFICIENT TOOTH DESIGN** — For fast and efficient cutting.
4. **BALANCED SET** — For clearance and accuracy of cut.
5. **CLEAR MARKINGS** — For easier, quicker identification.

**AND REMEMBER:**
**VICTOR GIVES YOU ALL 5!**

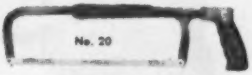
VICTOR

**SAW WORKS, INC. • MIDDLETOWN, N.Y., U.S.A.**
*Makers of Hand and Power Hack Saw Blades, Frames and Metal and Wood Cutting Band Saw Blades*

5600




**No. 10** — Yellow molded handle. Shaped for comfort. Almost indestructible!
Patented Lever-Lock positions, tensions blades *automatically*. **No. 15** — Red molded handle, chrome-plate finish. Same features as No. 10.




**No. 20** — Gunmetal Finish, features adjustable pistol-grip Frame, Lever-Lock for extra-easy blade change.

**FREE — FOR THE SHOP** . . . the Victor Metal Cutting Chart — an invaluable on-the-spot guide for shop metal workers.

**FREE — FOR YOU** . . . Victor's Handy METAL CUTTING GUIDE . . . packed with valuable information on blade types, cutting techniques . . . feeds and speeds . . . plus important general metal cutting information.



**VICTOR SAW WORKS, INC.**
Middletown, N. Y., U. S. A.

☐ Please send me the Victor Metal Cutting Chart
☐ Please send me the Victor Metal Cutting Guide

Name _____ Title _____
Address _____
City _____ Zone _____ State _____

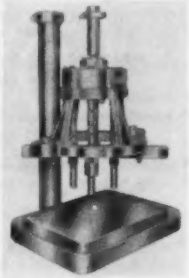
For more data circle **374** on Reader Service Card

## UNIVERSAL JOINT ADJUSTABLE DRILLING HEAD

Errington Mechanical Laboratory, Inc., Staten Island 4, N. Y., has announced the introduction of the No. 2 universal joint adjustable drilling head. All heads are equipped with No. 2 M. T. sockets. Overall length is 20 inches. Guide bars are bushed for 1 or 1¼ inch pins on 17½ inch centers. The diameter of lower clamping ring is 15⅞ inches. Minimum centers 1⅝ inches; maximum diameter pattern 9¾ inches. Approximate weight is from 60 to 75 pounds, depending on number of spindles. Case, cover, frame and locator arm casting are made of aluminum.

All spindles are hardened and ground with gears turned on spindles. Drive gear has heavy-duty grooved ball thrust bearings on top and bottom of gear and heavy-duty roller bearings top and bottom. All drill spindles have double needle bearings in locator arm and heavy-duty grooved ball thrust bearings. Spindles in head have Johnson bronze bearings. Throughout the head all thrust points are backed by heavy-duty grooved bearings.

For more data circle **84** on Reader Service Card



*Errington Drill Head*





No. 7 Dial Feed
Capacity, 80 tons

*Write for new Dial Feed Catalog*

What's the job? A standard operation—or one that's unique to your plant? Modernize with Federal Dial Feeds and watch production go up, costs go down. Eliminate need for expensive equipment. Finest materials and workmanship. 6 to 80 tons. Automatic feeds and ejectors if desired.

**THE FEDERAL PRESS COMPANY**
604 Division Street, Elkhart, Indiana

**FEDERAL DIAL FEED PRESSES**

*31 Years' Experience in Dial Feed Engineering and Construction*

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PARKER - MAJESTIC PM PRECISION MACHINES



# PARKER SPINDLES

## *FOR ANY MACHINE—FOR ALL APPLICATIONS*

**Following its development in 1915 and as a result of constant improvements through the years, the Parker Spindle has become one of the most widely used spindles in this country today on many makes of machines.**

**The demand for speed and endurance in grinding and precision boring which the Parker Spindle makes possible has made the Parker-Majestic Company one of the largest manufacturers of spindles.**

**PARKER - MAJESTIC, INC.**

**147 Joseph Campau, Detroit 7, Michigan**

For more data circle **376** on Reader Service Card

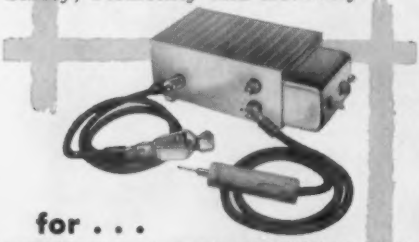



**for . . .**
**PRODUCTION SOLDERING**

Handles numerous soldering jobs from fine precision to medium-heavy industrial. More than 16 styles of electrode holders to fit individual soft or hard soldering operations.

From 6 to 30 stages of heat with a selector switch used in conjunction with 3 secondary terminals.

A wide range of power—5 to 2500 watts—quickly supplies concentrated heat at exact area—insures perfectly soldered joints with maximum Speed, Safety, Flexibility and Economy.



**for . . .**
**ETCHING & DEMAGNETIZING**

Marks the hardest steel, stainless steel, steel alloys or carbides with the ease and legibility of a pencil. 4 types of interchangeable marking points available to serve every purpose. 6 to 36 distinct marking heats. Easy to operate. Two tools in one. Demagnetizes over a 4 to 8-inch width. Especially valuable when tools have been in contact with magnetic chuck.




Write for New Catalog descriptive of all model Solder Tools, Etchtools, Demagnetizers . . . today.

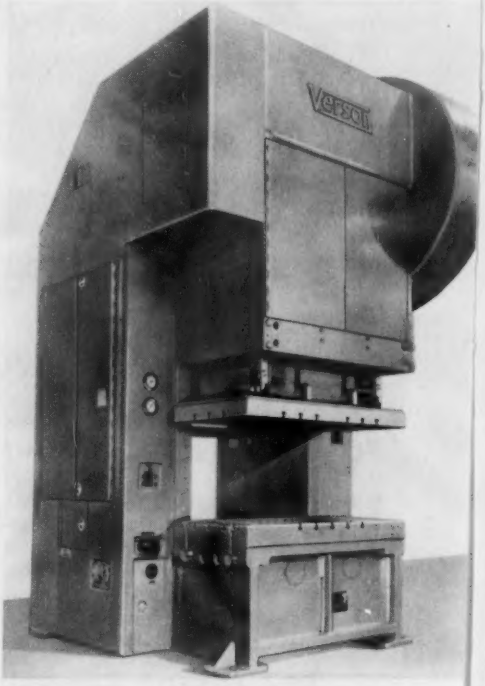
Luma
THE LUMA ELECTRIC EQUIPMENT CO.
P.O. Box 132-MS • Toledo, Ohio
For more data circle 377 on Reader Service Card


*new shop equipment . . .*

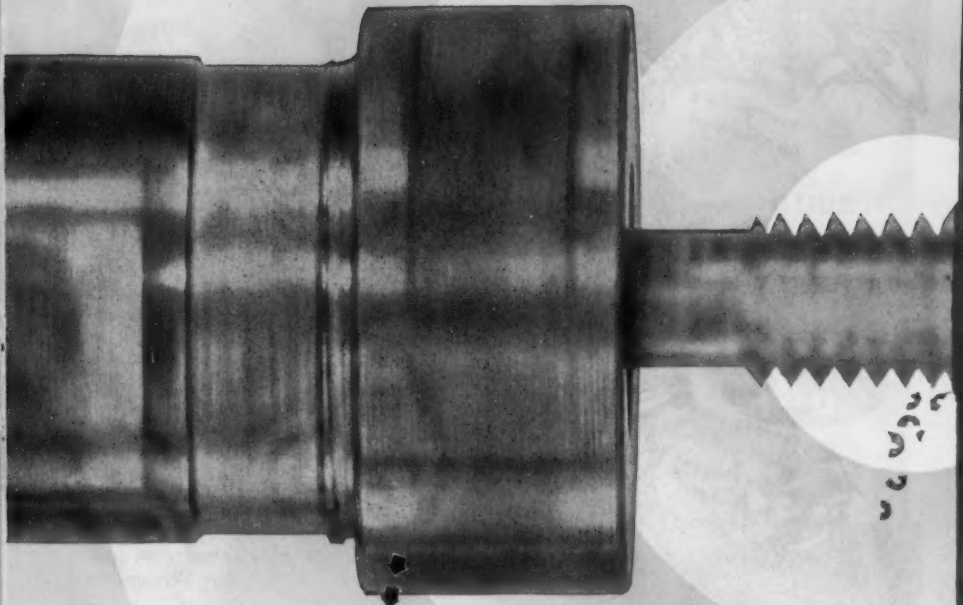
## COMPLETELY ENCLOSED GAP PRESS OFFERS UNUSUAL SAFETY AND CONVENIENCE FEATURES

A streamlined gap press has been designed and built by Verson Allsteel Press Co., 9300 S. Kenwood Ave., Chicago, Ill. The press features totally enclosed piping and wiring of all air, lubrication and electrical components. In addition, gears, flywheel, clutch and all other moving parts are fully enclosed, incorporating safety and convenience features to protect both operator and press.

Die space area of the press is well lighted for working convenience and there are receptacles and pockets for




*View showing Verson Allsteel Gap Press*



# Tops for Taps . . . it's a *Jacobs* CHUCK

Jacobs and your industrial supply distributor are ready to deliver the chucks you need and the service you deserve. First in chucks . . . first in service.

**THE JACOBS MANUFACTURING COMPANY • WEST HARTFORD, CONN.**



The Jacobs Model 91 Spindle Nose Collet Chuck for tool room and engine lathes.



The Jacobs Rubber-Flex® Tap Chuck for tapping heads and impact tools.



The Jacobs Plain Bearing Chuck for drill presses, portable electric and air tools.



The Jacobs Ball Bearing Super Chuck for heavy duty and precision industrial use.



The Jacobs Model 96 Collet Chuck for grinding machines, millers and jig-borers.




The Jacobs Impact Keyless Chuck especially designed for the aircraft industry.




Here are tools that provide effortless power for hundreds of production line jobs. Over the years leading firms have proved to themselves that to specify MALL TOOLS is to specify "satisfaction" for everyone involved with the use of power tools. MALL tools stay on the job longer and are easier to keep on the job. MALL Tools keep production "on the move." Send for your FREE copy of the MALL Portable Power Tool Catalog or Pneumatic Tool Catalog today.

**MALL TOOL COMPANY**
**Division of Remington Arms Company, Inc.**
**7814 South Chicago Avenue, Chicago 19, Ill.**
Please send your latest Portable Power Tool Catalog ☐ Pneumatic Tool Catalog ☐
*Name*_____
*Address*_____ MU-225

For more data circle **379** on Reader Service Card

safety blocks to prevent the press from operating while men are working in danger areas. 440 and 110 volt service outlets provide power for portable electric service tools . . . and a self contained air supply system provides air-powered service outlets. Exact position of the ram at any point in the stroke is shown by an electric indicator.

The press contains a completely automatic lubrication system with all gears totally enclosed and running in oil. A central lifting hook simplifies setting and moving the press. It is even possible to have the press moved from position to position for convenient location set-ups on special jobs. The complete electrical control system includes extra outlets and cams for tying press into automation lines and for automatically operating ejector type dies.

For more data circle **85** on Reader Service Card

★ ★ ★

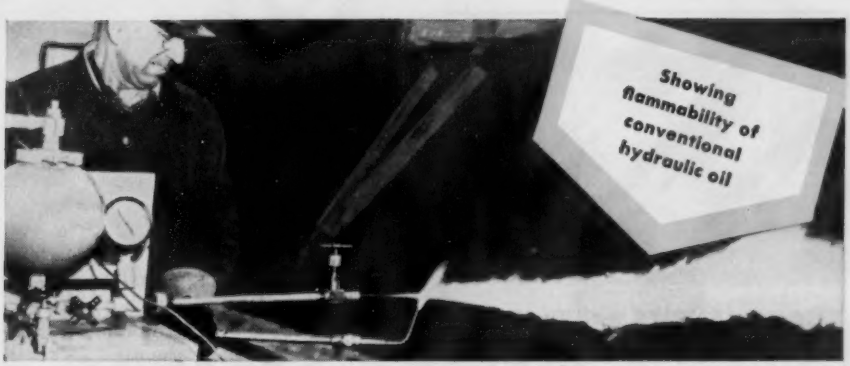
## INTERNAL BALL THREAD SEGMENTS

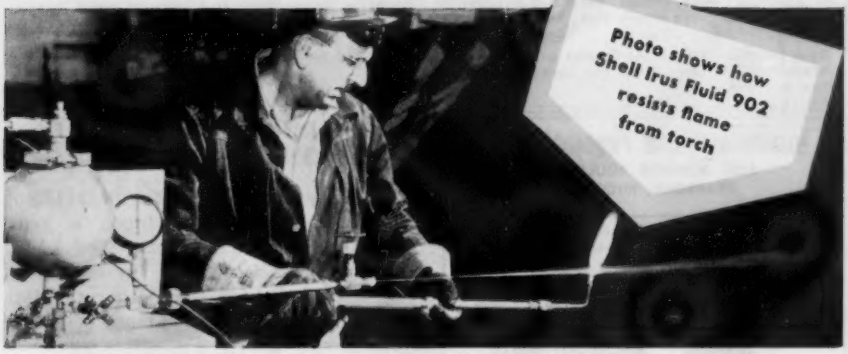
Internal ball thread segments for checking the size of internally threaded circulating ball nuts have been developed by the Bryant Gage and Spindle Div., Box 620-D, Springfield, Vt. These segments are used with the Bryant number 21 portable thread gage.

Each segment carries three balls located adjacent to each other in a helical groove corresponding to the pitch of the internal ball thread to be checked. The balls in opposite segments are 180 degrees apart giving a direct reading of diameter and providing a quick positive centering action.

The circulating ball nuts checked are used in ball bearing screw assemblies for the actuation of landing gears, power steering and similar applications.

The ball bearing screw assembly,




# Flame tests prove it's fire-snuffing ability

**Entirely new formula:** Shell Irus Fluid 902 is a special formulation . . . product of three years' development and field testing. It is suitable for nearly all industrial hydraulic systems, as a direct replacement for presently used oils. *Here is a fire-resistant hydraulic fluid that can be widely used.*

**Non-corrosive:** Shell Irus Fluid 902 contains no corrosive ingredients. It has no harmful effects on seals, fittings or bearings. It does not promote rust.

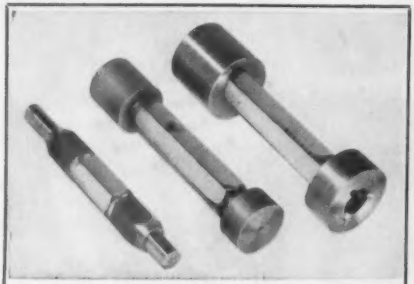
**No major modification necessary** . . . simply clean present fluid thoroughly out of system and replace directly with Shell Irus Fluid 902. You can use it with complete confidence. *Write for test data and all information to*

**SHELL OIL COMPANY**
**50 West 50th St., New York 20, N. Y.**
**or 100 Bush St., San Francisco 6, Calif.**

## SHELL IRUS FLUID 902

SHELL

For more data circle **380** on Reader Service Card



**GAGE HANDLES and BLANKS**

**IMMEDIATE DELIVERY—FROM STOCK!**

Order today from America's most complete stock of American Gage Design gage handles and blanks. Let us prove to you that "the best costs you less."

Write today for a Price List Catalog and complete information on how Huron can save you both time and money.

**HURON MACHINE PRODUCTS INC.**
6252 MONROE BOULEVARD
DEARBORN, MICHIGAN

For more data circle **381** on Reader Service Card

***Spin your* RIVETS**

***faster and more economically on the* NOISELESS LINLEY RIVETER**



Rivet spinning on the Linley is a sure way to cut production costs. With Linley equipment, you can easily produce finely finished rivets even in close places. Send us samples of the work you want riveted, and without obligation we'll show you how it can be done the Linley-way and what it will cost.

Machines available for handling iron and cold rolled steel rivets up to ⅜" and larger size rivets in softer materials.

***Send for Bulletin R today.***

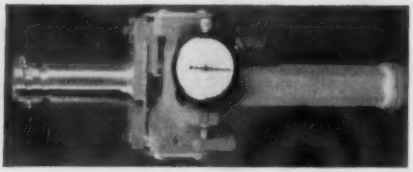
**LINLEY BROTHERS CO.**

***Also builders of JIG BORERS***

671 State St. Ext., Bridgeport 1, Conn.

For more data circle **382** on Reader Service Card


## *new shop equipment . . .*



*View of Bryant Internal Ball Thread Segment*

with the rolling ball principle applied to a screw and nut, is the most efficient known method of converting linear motion to rotary motion or vice versa, according to the manufacturer.

For more data circle **86** on Reader Service Card

★ ★ ★

### GEAR GRINDER FOR PRECISION WORK

The Sheffield Corp., Dayton 1, Ohio, has designed and produced a gear grinding machine called the Model 140. The machine is used for grinding external precision spur and both right and left hand helical gears, from 8 to 100 pitch.

Gears ground on this machine are used in precision instruments, gear train timing devices, fire control mechanisms, aircraft accessory power units, machine tools, engines, transmissions and where quiet gear operation is necessary. A number of gears of the same type can be ground simultaneously from hardened steel in preformed or solid blanks or, gears can be ground individually. The grinding wheel (12 by 5 by ½ to 2 inches) is formed to the basic rack form by the Sheffield automatic crushtrue R-wheel dressing process. The gear blank or blanks are mounted in grinding position between the head and tailstock centers.

The grinding operation is similar to hobbing in that the work rotates con-

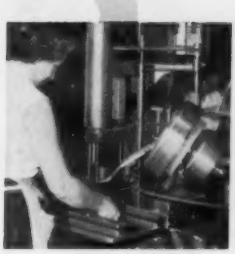
Your **PRODUCTION**

# DOLLAR$

will show

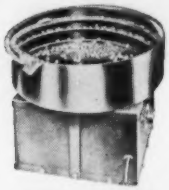
**BIGGER PROFIT**

# DOLLAR$



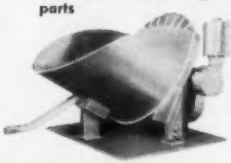



**by** speeding up your assembling and feeding operations with . . .



**BOWL FEEDER**

Vibratory type to select and feed smaller fragile parts



**BARREL FEEDER**

with stationary ring cover, for heavy-duty, large production runs

**DPS POWER METHODS**

● Stepped-up output . . . time saving . . . lower costs . . . Combine them . . . What do you get? A rise in profits. It's today's industrial challenge, and DPS POWER SCREWDRIVERS and SELECTIVE PARTS FEEDERS meet it effectively . . . plus the added advantages of uniform, better work, without interruption and the excessive cost of hand methods . . . More than 12,000 successful applications in progressive plants everywhere prove it . . . It lends assurance that we can meet your requirements. Write us . . . Tell us your set-up . . . We'll make recommendations.



**5 SCREWDRIVING MACHINES**

Bench and Pedestal types. Pedestal Model A pictured

**DETROIT POWER SCREWDRIVER CO.**

2807 W. FORT ST. DETROIT 16, MICH.

For more data circle 383 on Reader Service Card



*from Johnson's Wax*

# The only major improvement in coolants in 50 years

Johnson's metalworking fluids came in with automation. They are as efficient and advanced as 1956 high-speed machine tools. They bring you the first major improvement in coolants since 1900—*the use of wax and wax-type synthetics.*

Johnson's discovery has uncovered tremendous new profit possibilities for hundreds of progressive shops. To get increased production from men and machines, use Johnson's complete line of metalworking fluids for machining, grinding, forming.

Contact your local Johnson's industrial distributor. He will gladly set up an in-your-shop test. Be sure to ask about Johnson's money-back *Guarantee of Superior Performance* over ordinary coolants.

*S. C. Johnson & Son, Inc.*
Industrial Products Dept., Racine, Wisconsin

*Pictured below is Johnson's J-Cool, one of a complete line of modern coolants for today's high-speed production.*

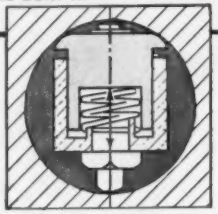






# YOU SET IT DIRECTLY TO GAGE BLOCKS or with a micrometer . . .

**Precise Centralization is Built-in**



Positive centralization. Single plunger eliminates off-center location, assures precise alignment of centralizers and sensitive contact.

**You can set this gage to gage blocks** or micrometers with perfect assurance that when you place the gage in the hole the contacts will locate precisely on the true diameter.

**Instead of using two separate centralizing plungers** which might respond unequally to a common source of pressure, thereby making centralization inaccurate, the 1250 Series Bore Gages have a single, large, spherically radiused plunger which contacts the circumference of the hole at two points. The generous bearing surfaces assure precise movement of the plunger so that pressure is exerted equally at each point of contact, causing the gaging head to seat with greater accuracy on the true diameter of the hole.

**The sensitive and reference contacts of each gage are radiused** precisely concentric with the plunger. Even when the gage is unintentionally cocked laterally, it still holds its accurate centralization. Write for complete details.

**FEDERAL PRODUCTS CORPORATION**
**61410 Eddy Street • Providence 1, R. I.**



Four gages inspect all diameters from ½" to 8"

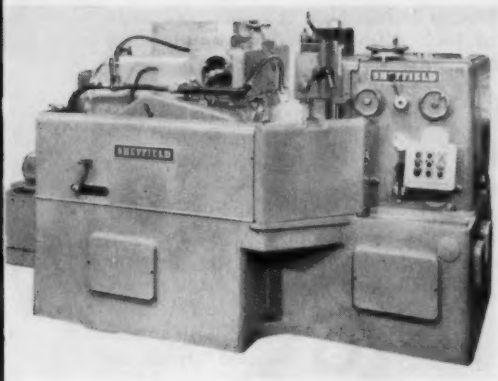
FEDERAL'S SOLUTION TO THE COST OF GAGING:
Impartial Gage Selection
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**FOR RECOMMENDATIONS IN MODERN GAGES . . .**

**Dial Indicating, Air, Electric, or Electronic — for Inspecting, Measuring, Sorting, or Automation Gaging**

For more data circle **386** on Reader Service Card



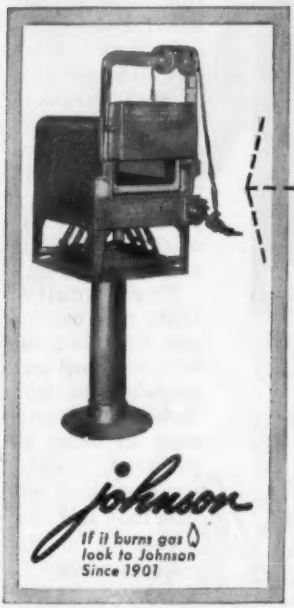
*View of Sheffield Model 140 Gear Grinder*

tinuously at a rate of speed synchronized with that of the grinding wheel. Simultaneously the work moves upward past the horizontal center of the wheel until the tooth form is imparted to the full face of the gear blank. In addition to this basic hobbing motion the work rolls across the full face of the helical rack form of the grinding wheel of the machine.

The standard Model 140 gear grinder will accommodate a maximum work diameter of 8 inch o.d. by 5 inch face width. Maximum length between centers is 15 inches. Change gears permit the number of teeth that can be ground to range from 4 to 192. Other capacities are also available. Maximum helix angle adjustment of wheelhead is 45 degrees right and left hand. The grinding wheel is mounted on a precision preloaded ball bearing spindle. Grinding wheel spindle speed is 2,100 r.p.m.; crushing speed, 116 r.p.m. The machine occupies a floor space 103 x 132 inches and is 71 inches high. All electrical and hydraulic units on this machine are built to J.I.C. standards.

For more data circle **87** on Reader Service Card

★ ★ ★ ★ ★


**VERSATILE** *johnson*
**NO. 706 FURNACE**

For *hardening, tempering* and *annealing* steels

Six No. 5, Type A Bunsen Burners give this versatile furnace a 400° to 1800° F. range. Temperatures easily controlled. Ratchet-operated door opens upwards. Use with natural, artificial, mixed or bottled gas. Economical and efficient with all. Firebox 7" by 13" by 16½". 78,000 BTU'S per hour. (Natural gas)

*Write for FREE Johnson catalog.*

No. 706 Pedestal _____$312.00
Bench Model _____$287.00
No. 654 — smaller version, 4 burners, 5" by 7¾" by 13½" Firebox.
Pedestal _____$174.00
Bench Model _____149.00
(All prices F.O.B. Factory)

**JOHNSON GAS APPLIANCE COMPANY**
571 E Ave., N.W.
Cedar Rapids, Iowa

For more data circle **387** on Reader Service Card

## CAM-TYPE TOOL EJECTOR

Scully-Jones and Co., 1909 S. Rockwell St., Chicago 8, Ill., recently introduced the Scully-Drift cam-type tool ejector which has been received enthusiastically in many industrial plants. This tool simplifies and speeds tool changes and virtually eliminates damage to machine spindles, bearings and tools often caused by hammering on a conventional type drift.

Previously, this extremely useful tool was available only in Morse taper sizes 2 and 3. Sizes 1 and 4 have been added so as to broaden the applications of the tool.

An important advantage of this ejector is the fact that it can be used with one hand, permitting the operator to hold the tool with the other hand. This ejector is designed with a cam-shaped profile on its bottom edge. When it is inserted, at a slight angle to the centerline, a mere twist of the wrist generates a powerful force against the tang of the tool and breaks it free from its locked position in the internal taper. This fast and easy tool ejection method means a marked reduction in tool change time and helps to greatly prolong the life of machine spindles and bearings.

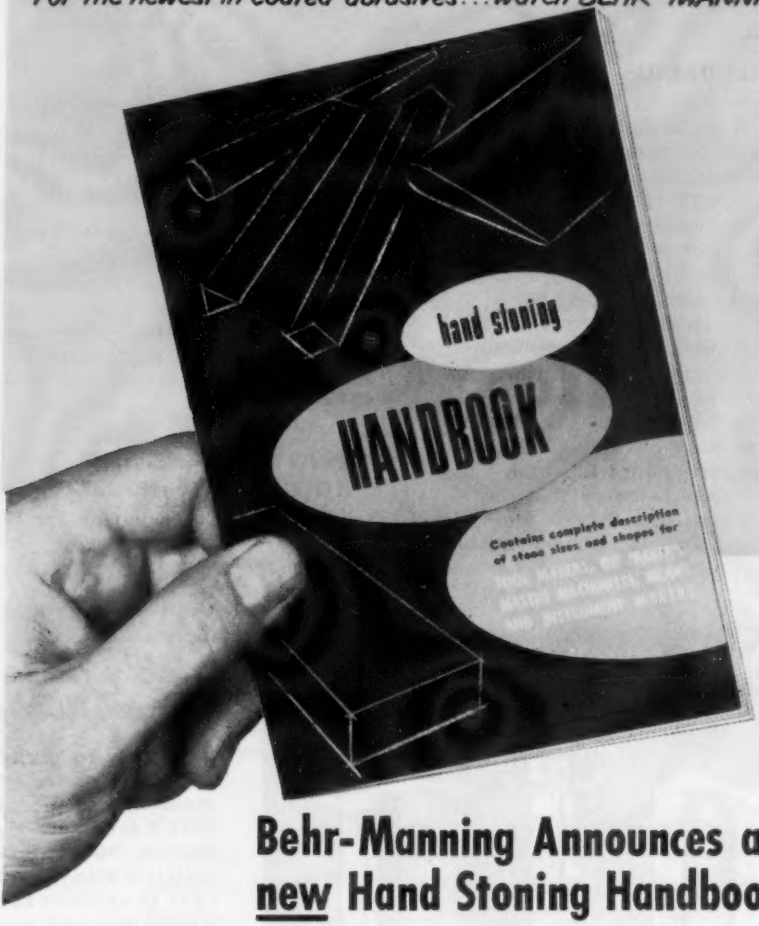
The Scully-Drift tool ejector can be used in both standard and keyhole type drift slots and is hardened in order to prevent mushrooming and assure long tool life, according to the manufacturer.

For more data circle **88** on Reader Service Card



For more data circle **388** on Reader Service Card

*For the newest in coated abrasives... watch BEHR-MANNING!*




# Behr-Manning Announces a new Hand Stoning Handbook

Here's 24 illustrated pages covering the many shapes and sizes available in the "World's largest line of oilstones." In addition, the booklet offers technical data on a variety of hand stoning operations. Write for your free copy today. Address Behr-Manning, Troy, N. Y., Dept. MS-10.

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a division of NORTON COMPANY
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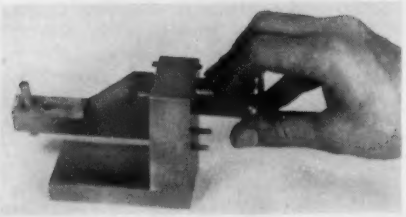
For more data circle 389 on Reader Service Card

*new shop equipment . . .*

## VERSATILE RADIUS DRESSER

Somerset Tool Co., 320 Virginia St., Hillside, N. J., has announced a dresser which is accurate to 0.0002 inch. Specially designed for bench surface grinders, this JR radius dresser shapes and dresses grinding wheel radii, either concave or convex or combinations of both. The dresser is smaller in size yet performs the same dressing operations as larger, more expensive models.

Any thickness wheel can be dressed, up to and including ½ inch thick. According to the manufacturer, even a beginner will find it easy to dress complex forms in a short time. There is no need to remove the guard as the wheel is dressed from below so that the operation is open and easy to see. Stop pins allow complete adjustment from 90 through 180 degrees. The diamond



*View showing Somerset JR Radius Dresser*

dressing point is simply set by measuring with a micrometer from top of measuring hood to bottom of dresser arm, according to the manufacturer.

For more data circle **89** on Reader Service Card

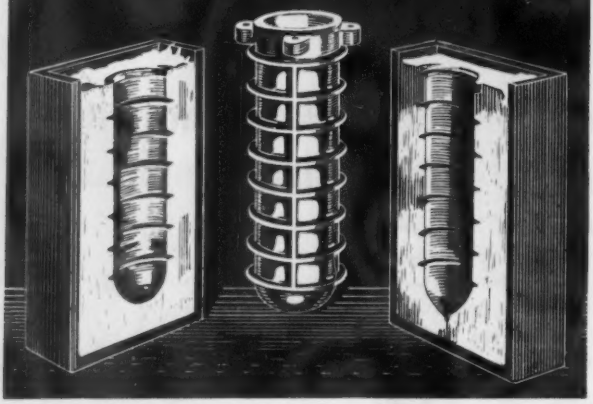
★ ★ ★

## PRINTING STRIP ANALYZER FOR ROLLING MILL INDUSTRY

Development of a production analyzing totalizer that prints a card record of the on-gage and off-gage footage

★ ★ ★ ★ ★


HOW TO CHUCK IRREGULAR PIECES



*quickly and inexpensively*

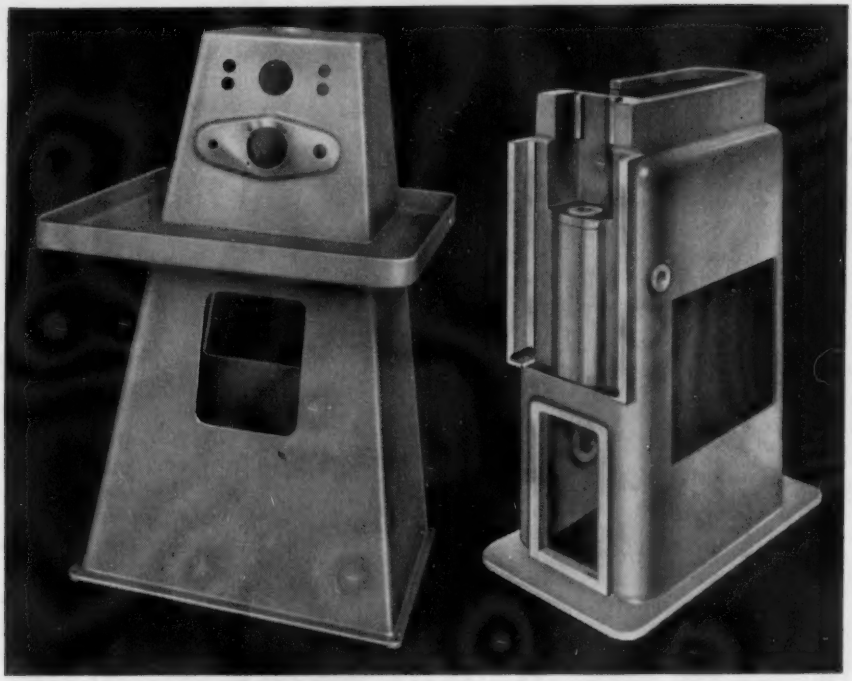
It's easy to make chuck jaws for irregular work-pieces with Cerromatrix[s], the low-temperature melting alloy. Just cast it against the workpiece and you get an accurately fitting pair of jaws. The alloy can be cast against forged metal parts, die castings, rubber, wood and most plastics without burning or warping the piece.

**Send for Bulletin 85— it tells the whole story.**

CERRO DE PASCO CORPORATION

304 PARK AVENUE, NEW YORK 22, N. Y.

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# LITTLEFORD complete fabricating

**layout**
**shearing**
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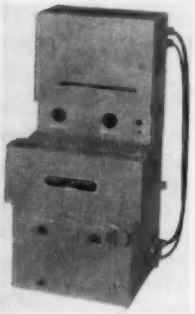
Littleford's complete fabricating facilities free your plant and equipment for your own manufacturing specialty. It's like finding a new building--with 175,000 sq. ft. of floor space, equipped for all kinds of metal fabricating. You'll welcome this additional capacity that'll keep your assembly lines rolling. And you'll profit from Littleford's experience, particularly in fabricating machine bases, guards and pans. Why not send us your blueprints today for prompt and accurate estimates? Littleford Bros., Inc., 433 E. Pearl St., Cincinnati 2, Ohio.

For more data circle **391** on Reader Service Card

of rolled strip metal produced by the rolling mill industry was announced by the Gage Division of the Pratt & Whitney Co., Inc., 25 Charter Oak Blvd., W. Hartford, Conn. The unit, operating in combination with either contacting or non-contacting continuous strip thickness gages, prints a permanent record in numerical, rather that chart, form—a feature long sought by the industry for record-keeping, for analysis and for later shearing operations.

A typical installation on a finishing mill will accumulate the undersize, ongage, oversize and total footages in a coil on the last pass through the strip mill. At the end of the pass the operator inserts the standard production work card in the printer, and these footages as well as the time, the date, the coil number, the operator's number, and sets of tolerance zones, are imprinted for the permanent record. During this operation the counters are automatically reset for the next coil.

This card printer is actuated by a Pratt & Whitney Model D classifying control, in conjunction with a contactor pulsed by the mill drive.

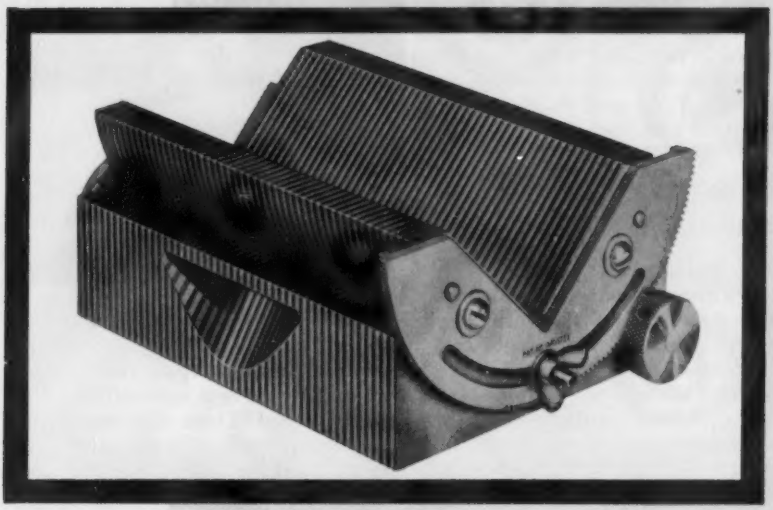


*Pratt & Whitney Printing Strip Analyzer for Rolling Mill Trade*




For more data circle **392** on Reader Service Card

## precision setup for precision grinding



with the new

# ANTON MAGNETIC ADJUSTABLE V-BLOCK

**This unique precision workholder** permits quick and accurate setups, saving time, effort and money in grinding operations.

**Laminations are held without pins or rivets** and cannot shift, and a laminated insert is furnished FREE for larger, flat work. The Anton Adjustable V-Block can also be used on drill presses or other machines equipped with magnetic chucks.

**Compare these distinctive features:**

- **Parallelism: ±.00005" over entire length**
- **Maximum setting: 90° angle**
- **Vernier accuracy: ±15 seconds**
- **Size: 6" long, 4½" wide, 2½" high**
- **Unsurpassed for layout, toolroom and production**

**Anton** *Write today for complete technical data to:*

**Machine Works**

**1226 Flushing Avenue, Brooklyn 37, New York**

**Standard & Magnetic Parallels • Standard & Adjustable V-Blocks • Diamond Holders • Milled Blanks**

For more data circle **393** on Reader Service Card

The tolerance limits are easily adjustable to meet specific requirements.

The card printer and totalizer unit is an accessory which may be added to the company's new and existing continuous gaging systems.

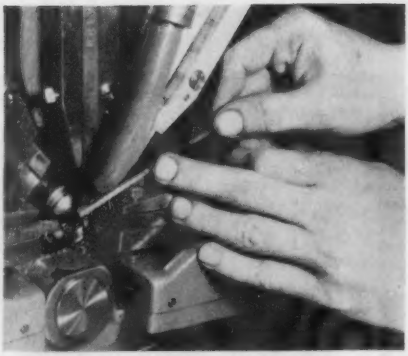
For more data circle **90** on Reader Service Card

★ ★ ★

## DIAMOND HAND FILES

Starlite Industries, Inc., Philadelphia 39, Pa., has announced a new line of diamond hand files. Downtime is said to be eliminated when tools and dies are dressed or sharpened on the machine with these files.

According to the manufacturer, there is no necessity to remove tools for sharpening. The machine is stopped and a few moments work with a diamond file will prepare the tool for immediate operation. These files can also be used anywhere a conventional hone would be used. These files come in six shapes for various applications and can be used on alloys, carbide, ceramics, hardened steel and titanium.



*View of Starlite Diamond Hand Files*

For more data circle **91** on Reader Service Card


**NEW DRILLS FROM OLD WITH NU-TANGS**




**Send us your old drills—we'll make them new again at a fraction of the cost of a new drill! Exclusive NU-TANG* process replaces twisted or broken tangs with brand new tangs of correct size — and with GUARANTEED ORIGINAL STRENGTH. No welding—No distortion —No shortening of drills—No sleeves.**

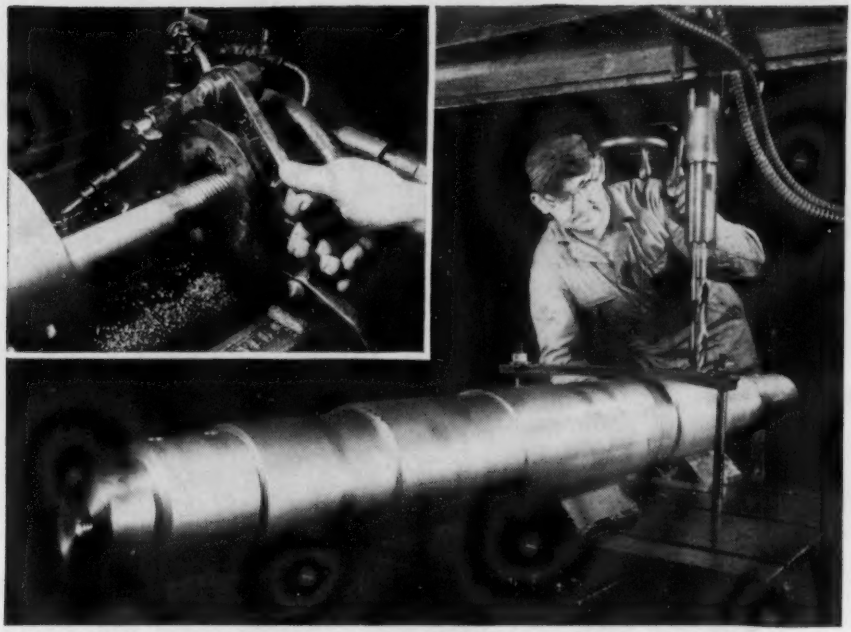
**Any drill, reamer, or other tool with a Morse taper in sizes 2 to 6 can be repaired perfectly this quick new way. Delivery—One week. Used by many leading industrial plants. Amazingly low cost—satisfaction guaranteed! Send for complete information.**

*** Patent No. 2,512,033**

write today

**NU-TANGS INC.** 1335 Bates Street Cincinnati 25, Ohio

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**Need extra-strong, free-machining alloy steel?**

# Call us for FC ALLOY STEEL

Like most mining concerns, Putman and Greene, Inc., Philipsburg, Pa., uses a good bit of steel to repair and maintain their fleet of off-the-road haulers and earth-moving equipment. Listen to what Mr. Russel Lucas, Shop Superintendent for the company, says about FC Alloy Steel: "FC machines so well and has such superior strength that we use it exclusively for the turning of pins, bolts, shafts and axles."

*Here are some facts about FC Alloy Steel:*

It gives about 3 times the tool life of comparable machining steels.

It is delivered heat-treated to 255 to 302 Brinell hardness.

It has from 125,000 to 140,000 psi tensile strength.

U. S. Steel Supply can sell you FC Alloy Steel Bars in any size or length you need. You get fast delivery, too. Call us today.

## U. S. STEEL SUPPLY

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USS

**Warehouses and Sales Offices Coast to Coast**

UNITED STATES STEEL

For more data circle **395** on Reader Service Card

*new shop equipment . . .*

## COMPACT MICRO-FOG LUBRICATION UNIT

A lubro-control unit specially designed to meet the needs of manufacturers and users of machine tools for a small, compact, complete lubricating unit is now being marketed by C. A. Norgren Co., 3400 S. Elati St., Englewood, Colo. The small, 6 x 6 x 5¼ inch, cabinet-type 33AG-4 unit supplies air-actuated feed mechanisms, chucks, clutches, brakes and other air-operated parts of machine tools with filtered air, regulated air pressure and micro-fog lubrication. Micro-fog is a finely divided air-borne oil fog that can be transported great distances with negligible precipitation in air lines and can be appropriately distributed to multiple lubrication points.

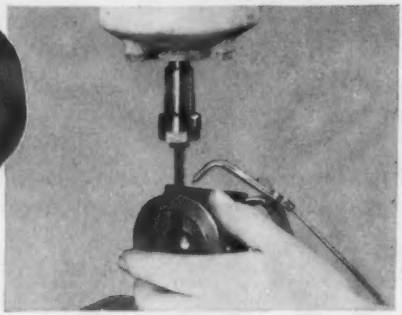
The unit provides the following features: fog lubrication with oil particles of micron size, visible oil feed for accurate flow control and positive proof of lubrication, lubricator performance over an air flow range of 4 to 85 c.f.m., ⅝ pint oil reservoir, clear and wide-angle visibility of oil level, easy oil refilling, relieving-type pressure regulator, choice of 64 or 25-micron filter element, optional location of filter drain, two auxiliary air take-offs for supplying filtered air for other than lubri-



*View of Norgren Lubro-Control Unit*


**TAPS 6-¼" HOLES IN A *COOL* 14 SECONDS!**
**AND TAPPED 6000 HOLES JUST AS QUICKLY WITHOUT CHANGING TAP**





**The rings were malleable iron castings. The holes were tapped to a depth of ½ inch at 1700 R.P.M.**

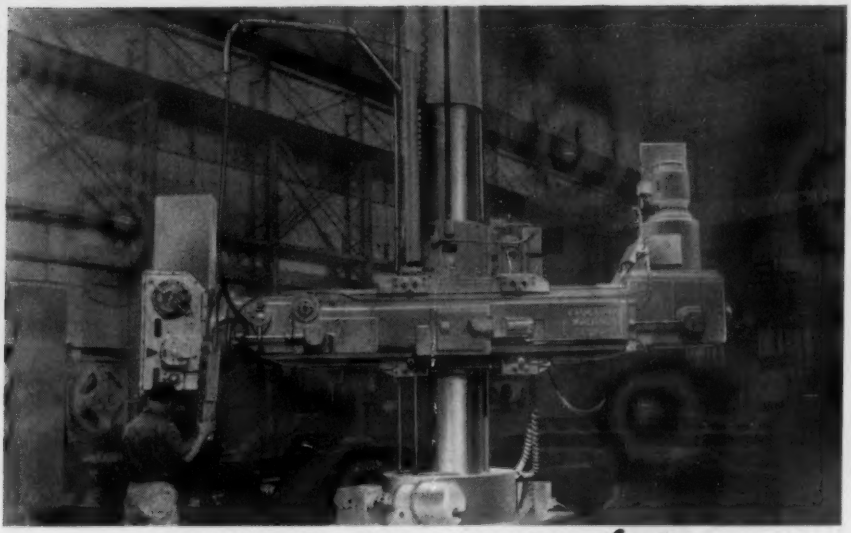
Hardly seems possible . . . yet this and other equally amazing tooling operations are becoming an everyday occurance in plants equipped with the new Mistic Mist method of cooling tools. Compressing air generates heat . . . expanding air absorbs heat. Add this to the evaporation of moisture and movement of air and you will understand why the application of mist is the most effective, practical and cleanest method of cooling all metal working processes. Mistic Mist is the most economical and efficient mist generating system available . . . requires no special coolant. Systems available for as low as $30.00.

*WRITE TODAY FOR COMPLETE INFORMATION*

Mistic Mist Coolant Mist Generators

**AETNA MFG. CO.**
**193 SO. YORK ST., BENSENVILLE, ILL.**

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# A JOB THAT ONLY A *Kaukauna* UNIVERSAL RADIAL DRILLING, TAPPING AND BORING MACHINE CAN DO—

*faster, easier, at lower production cost.*

## HOW 2 JOBS WERE PERFORMED AT THE SAME TIME ON THE SAME PIECE

to save costly positioning, material handling and machine shutdown.

A nationally known manufacturer of large automotive and aviation components ordered a Kaukauna Model 140-U Portable Universal Radial Drilling Machine to be used for drilling, tapping and reaming aircraft structure sections at a multiplicity of angles. However, tooling operations on the original setup were not completed when the machine was received, so it was put to work in conjunction with a Giddings & Lewis Horizontal Boring Machine and a power rotary table.

The workpiece was mounted on the table and at the same time that milling and boring operations were being performed with the Giddings & Lewis, the Kaukauna Model 140-U performed the vertical, horizontal and angular drilling, tapping and reaming operations.

Having completed this work, this portable 4" spindle Universal Machine was moved from station to station throughout the plant by overhead crane to perform the many drilling, tapping, reaming and boring operations necessary to tool up the original program.

## —AND HOW THIS LEAD TO THE PURCHASE OF A SECOND KAUKAUNA RADIAL.

The tool room supervisors quickly realized the great savings in time and labor made possible with the Kaukauna Universal, and immediately ordered the smaller 2½" spindle Model 125-U for tool room use exclusively.

*Learn now what a Kaukauna will do for you by time estimates on your various jobs.*

*See your nearest Kaukauna distributor, or phone, write or wire direct.*

**KAUKAUNA MACHINE & FOUNDRY DIVISION**
GIDDINGS & LEWIS MACHINE TOOL COMPANY
KAUKAUNA, WISCONSIN, U.S.A. TELEPHONE ROCKWELL 6-4631 CABLE KAUMACH

For more data circle 397 on Reader Service Card

cation purposes, greatly simplified maintenance and in-line pipe connections for easier installation.

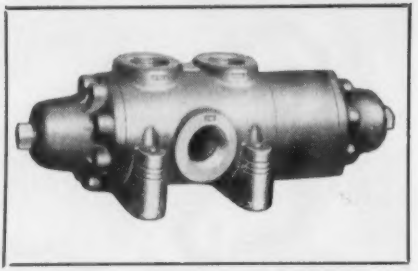
All controls and indicators of the unit are conveniently located on the front panel. No tools are required for access to the filter element and for oil refilling and a removable back cover provides easy access to other parts. It is designed for main line air pressures not exceeding 150 p.s.i. and for regulated air pressures of less than 125 p.s.i. It is available in ½ inch pipe size.

For more data circle **92** on Reader Service Card

★ ★ ★

## AIR PRESSURE HYDRAULIC VALVE

A hydraulic four-way valve, air pressure operated by air pilot valve, is being offered by Rivett, Inc., Brighton 35, Boston, Mass. The air pressure feature of the hydraulic valve permits using it automatically when the air pilot valve is controlled mechanically. The Model 5950 valve is available in standard action, spring-return, and spring-centered: with spring-return valve, the piston is moved to original position when pilot pressure is drained off. It requires one air pilot line for remote operation in one direction; spring-cen-



*Rivett Air Pressure Hydraulic Valve*




**DON'T LET REJECTS GET OUT OF *Control***

With a Ziegler Tool Holder you can make set-ups for tapping and reaming at lower cost for the simple reason that you can make them in a shorter time.

This is because, with a Ziegler Holder, it is not necessary to be as painstaking as when making set-ups with ordinary tool holders. Just come within 1/32″ of center on the radius (or 1/16″ on the diameter) and the Ziegler Holder automatically does the rest.

If reducing costs is an important consideration in your plant operation, change over to Ziegler Tool Holders. It will pay you well.

***PROMPT DELIVERY***

**W. M. ZIEGLER TOOL CO.**

Ziegler ROLLER DRIVE **FLOATING HOLDER** for Taps and Reamers...

13566 AUBURN
DETROIT 23, MICH.

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**New working flexibility! New ease of handling ...even on toughest, hard-to-reach jobs!**

# MODEL 75 1/4" SKIL DRILL

## WITH HIGH-TORQUE KEYLESS CHUCK



**Model 75 Drill, $49.50**
**with Keyless Chuck, $54.25**

**Speeds bit changing, ends key fumbling!** Famous Model 75 Drill now offers fresh working advantages with high-torque keyless chuck. Gripping power is even greater than with a keyed chuck! Highest accuracy, fine balance, and fast bit changing. Tightens by hand—no more keys to lose.

**Other Important Features That Make SKIL Model 75 Your Best Drill Buy!**

- **55% more powerful, yet lighter in weight than other drills!**
- **Choice of 7 speeds (500 to 5,000 r.p.m.).**
- **Handy, safety-designed trigger lock for continuous operation—side location for easy use.**
- **All anti-friction bearings for longer drill life.**
- **Large inspection plate for routine maintenance.**
- **Comfortable "contour-grip" handle.**

***When You Buy A Drill, Be Sure It's A SKIL!***

**FREE!**

Let your SKIL Distributor prove SKIL superiority with a demonstration and FREE trial. For information and literature, write:

**SKIL Corporation, Dept. MMS-106**
**5033 Elston Ave., Chicago 30, Ill.**

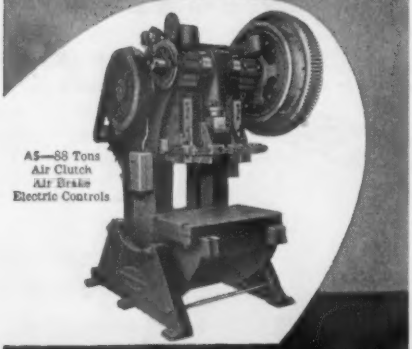
**SKIL**
**PORTABLE TOOLS**

Made only by SKIL Corporation
formerly SKILSAW Inc.
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Factory Branches in All Leading Cities

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Backed by nearly a half century of dependable performance

. . . yet modern to the minute for today's exacting demands.



A5—88 Tons
Air Clutch
Air Brake
Electric Controls

- Engages smoothly; no sledge hammer blow.
- Inched, single stroke, or continuous.
- Less heat as brake is released when clutch is engaged.
- Less current used; brake is off when clutch is engaged.
- Clutch torque output in direct ratio to applied air pressure and controlled by regulator valve.
- Two run buttons, one stop button, one inch button operate on 110 volt regardless of motor current (220 or 440).
- No back lash when using air cushion or heavy spring pressure pads.
- Clutch is reversible. (By reversing wires on motor you can inch out of stall).

Robinson Presses are available (in either pin type or air clutch models) in sizes from 32 to 88 Ton.

*Write for illustrated brochure and specification sheet.*

ROBINSON PRESSES

NEW ALBANY MACHINE MFG. CO.
NEW ALBANY, INDIANA

For more data circle **400** on Reader Service Card



tered valves require air pilot lines to each end of valve for remote operation in either direction and when both pilot pressures are drained off, the piston is spring-centered.

Designed for 1,500 p.s.i. pressure, these valves are offered in 7 sizes: ¼, ⅜, ½, ¾, 1, 1¼ and 1½ inch; spring-centered valves are available in 5 piston designs to meet the requirements of any hydraulic circuit; standard action and spring-return action valves are available in one piston design.

The valves feature a "floating piston" design. In this construction, the valve piston has a precision fit with the valve bore by the fact that the valve stem is independent of the valve bore. The valve stem is supported in the bearings in the valve covers without influencing fit of the piston in the valve bore. This design assures leakproof operation and provides smooth, positive opening and closing. "Quad" ring seals on the stem reduce friction. Large passages provide smooth, full efficient capacity flow.

For more data circle **93** on Reader Service Card

★ ★ ★

## PUSH PULL TAPPING UNIT

Supreme Products Corp., 2222 S. Calumet Ave., Chicago 16, Ill., has announced a device known as the Supreme push-pull tapper. The push-pull tapper is an instant-reversing speed reduction unit made expressly for tapping and to any portable drill. The speed reduction of 7:1 in the driving direction gives the operator more than adequate power to tap in all materials. Instant-reversing means that the direction of the tap can be reversed without stopping the drill motor. Thus the operator can move the tap into and out of the hole at will. In case chip accumu-

# 15,000 THREADED NAILS per hour with HARTFORD Thread Rollers . . . *Automatically*



## *USER REPORT:*

From Chas. F. Baker & Co., Framingham, Mass., John P. Hillberg, General Manager: "Hartford Special machines have been more than satisfactory on production and especially economical on up-keep."

## *QUICK SPECS*

Nail Diam. Capacity—.080" to .169"
Thread Length Capacity—⅛" to 2"
Production Rate—250 pcs. per min.
Floor Space Required 4' x 5'
Machine Size—42" x 26" x 52"

Nail down the answer to your nail and screw threading problem. Check the specs.

*For detailed information write for Bulletin TR-102.*

**Machine Tool Accessories Division**
**THE HARTFORD SPECIAL MACHINERY CO.**
**27510 Homestead Ave., Hartford, Conn.**

**HARTFORD** *Special*

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AUTOM



**CONTINUOUS HINGES**

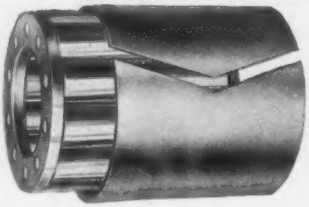
*Manufactured by*

**AUTO MOULDING & MFG. CO.**

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**TYPE GC**

**INDUSTRIAL ROLLER BEARING**

**STANDARD SIZES ARE SHOWN IN OUR GENERAL CATALOG SENT UPON REQUEST. SPECIAL SIZES TO ORDER.**

**ANY QUANTITY, "ONE BEARING OR MANY"**

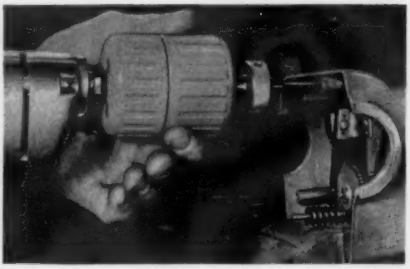
**THE GWILLIAM COMPANY**

*Incorporated 1912*

**358 FURMAN ST. BROOKLYN 1, N. Y.**

For more data circle **403** on Reader Service Card





*View of Supreme Push-Pull Tapping Unit*

lation is hindering the tap movement the operator can back it out a few turns then drive it again, all without stopping, the operation.

The manufacturer emphasizes that though this tool is small in size, and inexpensive, it is nevertheless a true "production" tool, and is competitive in performance with high priced single-purpose tools.

The manufacturer states that the biggest single advantage that the unit offers is the extra "feel" that it gives the user while he works. The housing of the unit is held in the fingertips and any unusual strain is felt instantly. The tap stops when the fingers are released, and runs in reverse when the rear housing of the tool is held. This "feel" accounts for the virtual elimination of tap breakage according to the manufacturer. The tapper handles all taps up to 5/16 inch and the five necessary collets are included with the unit.

For more data circle **94** on Reader Service Card

★ ★ ★

## CENTERING MACHINE FOR MOTOR CAM SHAFTS

A machine designed to perform a centering operation on such parts as motor cam shafts and crank shafts at a high production rate has recently been

# Abrasive Cutting

*the best way to cut many materials*
*the only way to cut some*

# Allison Cut-Off Wheels



## Wide variety of shapes and materials cut with abrasive wheels

• Speed and quality of cut make abrasive cutting ideal for a wide range of operations. For example: one inch cold rolled steel can be cut with a wheel cost of under ½ cent per cut and in 3 seconds.

ALLISON Cut-Off Wheels can provide smooth, high-quality cutting for almost any type of material however hard. These include steels of practically all analyses including corrosion-resisting types, brass, bronze, Monel Metal and other non-ferrous; aluminum alloy, magnesium and many others.

Whatever the problem there is an ALLISON Abrasive Wheel to meet it. Rubber bonded wheels give long wheel life and smooth, fine-finish cuts for wet cutting. Resinoid bonded wheels are best for dry cutting when quality requirements are less exacting.

## Consult a specialist for best results

Are you getting the most from your cutting methods? Abrasive cutting methods, properly done, can be 10 to 20 times as fast as metal sawing. Let an ALLISON abrasive cutting specialist check your hardest cutting job.

Allison ABRASIVE CUTTING WHEELS

ACCO

TRADE MARK

*Send for Booklet "ABRASIVE CUTTING" Today*

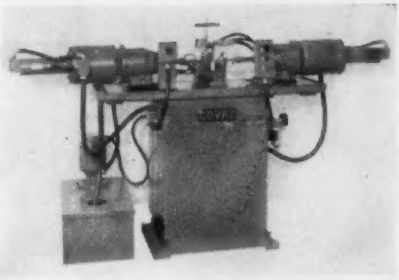



## ALLISON DIVISION
## AMERICAN CHAIN & CABLE

254-D Island Brook Avenue, Bridgeport 8, Conn.

For more data circle **404** on Reader Service Card

announced by the Govro-Nelson Co., 1933 Antoinette, Detroit 8, Mich. The machine, which incorporates two opposed Govro-Nelson automatic drilling units, is simple to operate. The operator merely loads the part into a fixture and depresses the start cycle switch, whereupon the work is automatically clamped, centered at both ends and unclamped, ready for the operator to remove. The production rate for the machine is approximately 360 pieces per hour.



*Govro-Nelson Automatic Centering Machine*

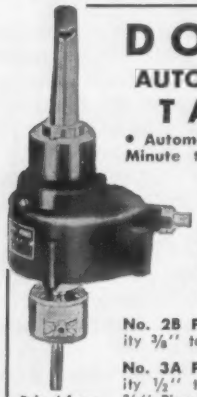
By making minor changes, the machine can be readily adapted to a variety of parts.

For more data circle **95** on Reader Service Card

★ ★ ★

## NOSE ADJUSTMENT FOR MASTER FEED FINGERS

Green Mfg. Co., 122 S. Prairie Ave., Rockton, Ill., has announced a new type of master feed finger designed especially for use on multiple spindle screw machines. The design makes it possible to adjust the fingers at the machine. The nose cap can be easily removed and tension of the finger loosened or tightened by the operator.

**DORMAN**
**AUTOMATIC REVERSE TAPPERS**

- Automatic Torque Control, One Minute to Adjust, Prevents Tap Breakage, Operator Need Not Be Skilled.
- WIDE RANGE TAP CAPACITY.

**No. 1A FRICTION DRIVE TAPPER** — capacity No. 2-56 to 3/8" in Steel — 1/2" in Aluminum.

**No. 2B POSITIVE TAPPER**—capacity 3/8" to 7/8" in Steel.

**No. 3A POSITIVE TAPPER**—capacity 1/2" to 1 1/4" in Steel—1/2" to 3/4" Pipe Taps.

**No. 4A TAPPER** — capacity 3/4" to 2" in Steel including Pipe Taps.

- PRODUCTION THREADERS with Round Split . . . Button . . . Acorn Dies.

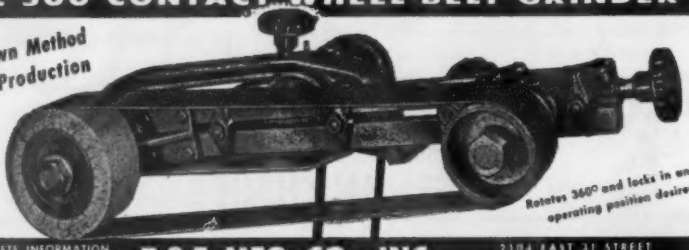
Priced from **$55.00**
Write for Bulletin
**IMMEDIATE DELIVERY**

THRIFTMASTER PRODUCTS CORPORATION
Division of Thomson Industries, Inc.
1034 N. PLUM STREET, LANCASTER, PA.
STANDARD UNIVERSAL ADJUSTABLE AND SPECIAL FIXED CENTER DRILLHEADS

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**MODEL 500 CONTACT WHEEL BELT GRINDER**

The Fastest Known Method of Increasing Production



Rotates 360° and locks in any operating position desired.

WRITE FOR COMPLETE INFORMATION ON INCREASING YOUR PRODUCTION

**B&E MFG. CO., INC.**

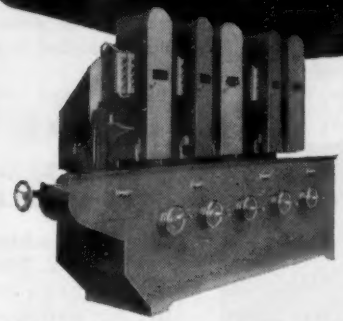
2104 EAST 31 STREET
KANSAS CITY 9, MISSOURI

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# Double Production

*by grouping several operations on one*

## Engelberg Abrasive-Belt Grinder!



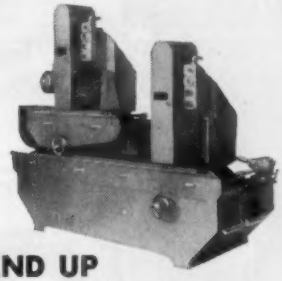
### MODEL 680-5 MULTIPLE-HEAD GRINDER Available up to 6 Heads

Single-cycle grouping on 5-headed machine above might include: deburring, flat-surfacing, sizing, polishing and fine polishing. Stock removal is at high speeds. Large grinding area, long belt disperses and dissipates heat. Runs wet or dry.

### FOR GRINDING BOTH SIDES OF FLAT WORK

Piece-work first passes under grinding head at left, then is carried around bend to bottom conveyor belt. Unground face is now *up*, positioned for passage under second grinding head at right.

Model 2-1092



### PRODUCTION INCREASES OF 100% AND UP

are not uncommon with the high-production semi-automatic abrasive-belt grinders shown here. Fine finishing to close tolerances may be done on *any* ferrous or non-ferrous metal, plastic or other material.

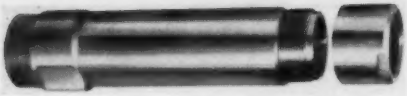
Precision manufacturing of these and scores of other models has provided facilities and experience ideally suited to the solution of problems in abrasive grinding. Our methods-engineers will gladly go over your drawings or samples of typical production pieces for operational analysis—no cost or obligation. Just write.

**The ENGELBERG HULLER Co., Inc.**
**110 Seneca St., Syracuse, N. Y.**

See the newest ENGELBERG Models at the METAL CONGRESS SHOW—BOOTH 2746

**ENGELBERG PRECISION ABRASIVE-BELT GRINDERS**

For more data circle **407** on Reader Service Card

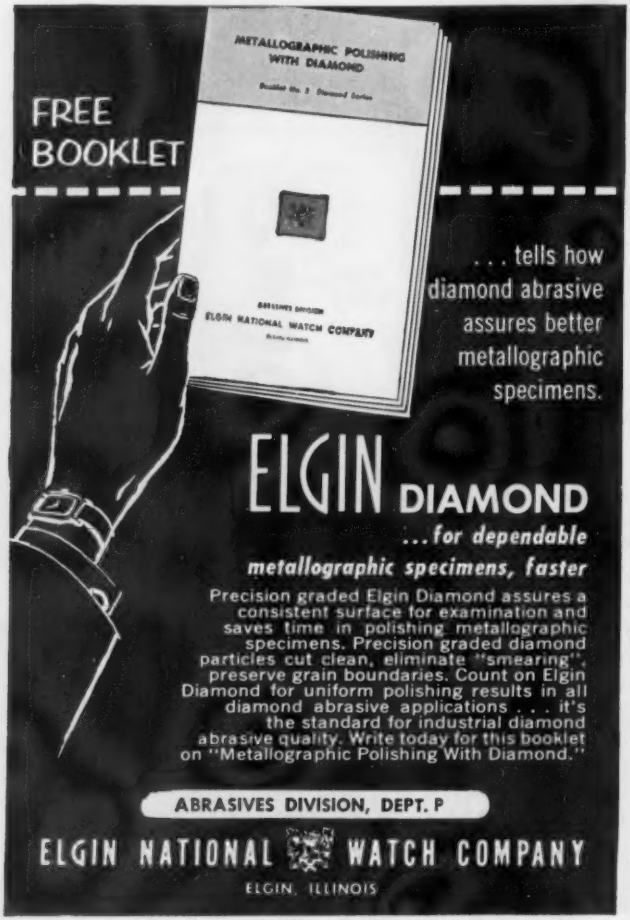


*View of Green Master Feed Finger*

The manufacturer states the feed fingers include the same distinguishing features as the original design—oil and wear-resistant synthetic rubber inserts which grip and feed any bar stock without scratching or scoring. The fingers are made from fine materials and are heat treated under high standards. The new design is available for many different types of multiple spindle automatic bar machines and are suited to a wide variety of applications.

For more data circle **96** on Reader Service Card

★ ★ ★




For more data circle **408** on Reader Service Card

## PRESS HAS EXTRA DIE SPACE

Service Machine Co., 2310 W. 78th St., Chicago 20, Ill., has announced the introduction of a new 15-ton Rousselle press. The machine, known as Model 2E, is built for heavy-duty, continuous production and features an increased die space of 12 inches (from bed

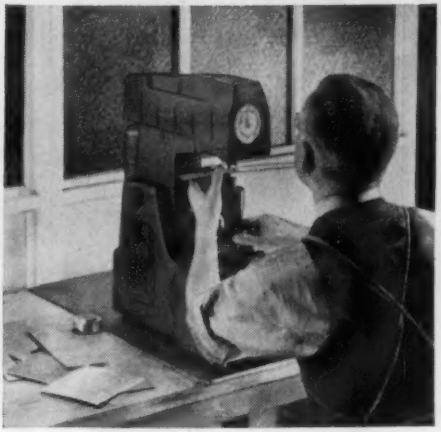


*Rousselle 15-Ton Heavy-Duty Press*

ACCO products

# Wilson "Rockwell"* Hardness Testers

## Is HARDNESS an important factor in your business?



• If your business involves metals or, in many cases, plastics, successful operation often requires *exact* knowledge of the proper hardness of the materials you make or work with.

**IN HEAT TREATING DEPARTMENTS—**

WILSON "ROCKWELL" testing of hardened and tempered steels is almost universal. This is especially true for plain carbon and alloy steels. It is as easily done by a production worker as a metallurgist.

**IN METALLURGICAL LABORATORIES—**

They provide means for establishing thousands of hardness specifications. Their use insures quality of product, reduces defects and maintains good name and reputation.

**IN TOOL ROOM OR PRODUCTION**

They are relied upon for absolute guidance as to the hardness of tools and the metals to which they are applied. They are also ideal for production testing. Each test may take as little as 3 to 5 seconds.

**• For complete information on WILSON "ROCKWELL" Hardness Testers call or write today. There is a WILSON model to meet every testing requirement.**

**Trademark registered*

**VISIT BOOTH 1211**

National Metal Show • Cleveland Auditorium

OCT. 8-12, 1956

ACCO

**Wilson Mechanical Instrument Division**

**AMERICAN CHAIN & CABLE**

TRADE MARK

230-G Park Avenue, New York 17, N. Y.

for Better Value

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TO BE SURE OF *QUALITY*
Remember the Name

**HOGGSON**

**STEEL STAMPS**



CHAMFERED CORNERS *for locating the base*

**FINEST STEEL**

*long life*



ALSO IN REVERSE FOR MOLDS & DIES

Letters and figures, deep-cut in hardened, special-formula steel, assure clean impressions and long service. Wide range of letter sizes. At your Mill Supply or write for circulars.

**HOGGSON & PETTIS MFG. CO.**
New Haven 7, Connecticut

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to slide with stroke down and adjustment up) to accommodate a broad spectrum of job applications.

According to the manufacturer, operation is simplified, maintenance minimized and accuracy and uniformity assured on the machine. A smooth running roller bearing flywheel is mounted on a stout crankshaft and supported by a rigid frame. Adjustable ram guides maintain true alignment. After long periods of usuage the bearings are easily replaceable.

The clutch mechanism is oversize and can be set for single stroke or continuous operation. To facilitate set-up adjustment, the unit is equipped with a roller bearing inclinable device.

For more data circle **97** on Reader Service Card

★ ★ ★

## NEW POWER DRILL SERIES

Whitman & Barnes, 40050 Plymouth Rd., Plymouth, Mich., manufacturers of drills, reamers and carbide tools, now offer a series of short length power drills in fractional and wire gauge sizes.

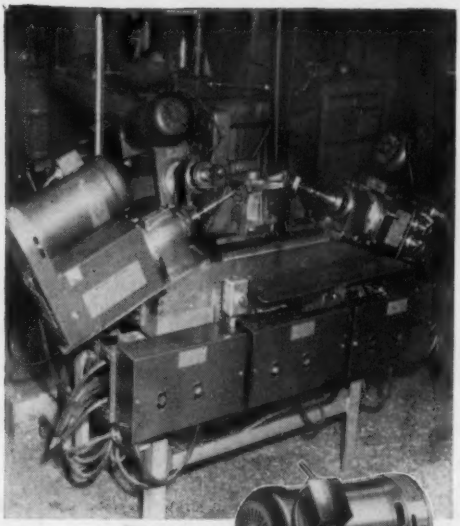
These drills are of the same specifications as screw machine drills except for specially designed, heavier webs which make them particularly suitable for use in portable machines. According to the company, these short length power drills will withstand considerable strain and will drill successfully where full length drills may fail. They can be used for drilling truck and auto bodies, sheet metal and stainless steels as well as general purpose drilling.

For more data circle **98** on Reader Service Card



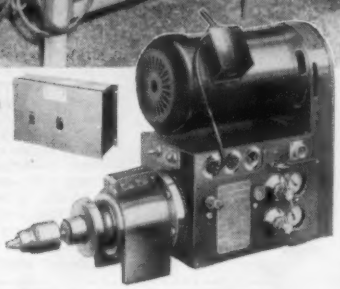
*New Whitman & Barnes Power Drill Series*

# Drill and Tap Automatically with this 2-in-1 Tool



**The NEW DUMORE Series 28**

## "DRILL-N-TAP" UNIT



### Saves Set-Up, Fixture and Service Costs

A large farm machinery maker, Massey-Harris-Ferguson, uses three new Dumore "Drill-N-Tap" Units to cut costs and increase production on power take-off housings. These units *automatically drill and tap* three holes in two sizes of housings without changing position on the same set-up. Drill bushings are simply removed when tapping. *Tap fits into chuck — no extra tapping head required!*

The Dumore "Drill-N-Tap" Unit is a *driller* and a *tapper* — all in the same automatic machine. Two tools in one — at the cost of only one!

- Mounts in 3 minutes—anywhere
- Quick set-up on job after job
- For long or short production runs
- No expensive clutches to wear out
- No long overhang
- Self-reversing motor, electrically controlled
- Work mounts close to fixture for little tool travel, less unproductive idling time
- 10 speeds from 265 to 4900 rpm standard
- Also mounts on standard drill press column for single spindle automatic driller and tapper

*Get a demonstration now... See your distributor, or write*

DUMORE

AUTOMATIC DRILL UNITS
TOOL POST AND HAND GRINDERS

PRECISION TOOLS

1302 Seventeenth Street • Racine, Wisconsin

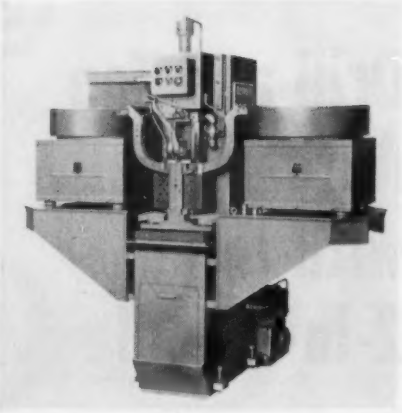
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## AUTOMATIC BROACHING PRESS PRODUCES 4,160 RADIUS GROOVES PER HOUR

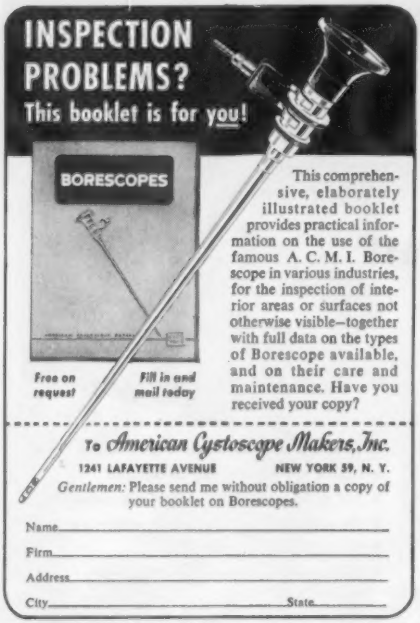
A hydraulic broaching press, designed and built by Detroit Broach & Machine Co., Dept. 131, Rochester, Mich., broaches a radius groove in both ends of two different length pinion gear blanks at the rate of 2,080 pieces per hour. The operation is fully automatic, requiring no operator. The blanks are loaded into hoppers on each side of the machine, positioned and loaded into feed magazines by vibration, pushed through stationary broaches by twin pushers attached to the hydraulic press ram, and unloaded automatically into ejection chutes.

Hopper loading can be done automatically, and the machine will stop if the hoppers are empty. Electrical and hydraulic systems conform to J.I.C. standards and are entirely self-contained. The machine is 9 feet wide by 4 feet deep by 5 feet high.

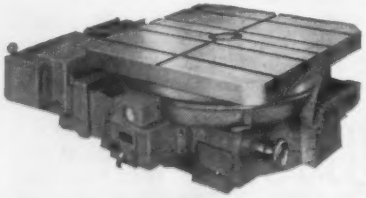
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*View of Detroit Automatic Broaching Press*


For more data circle **412** on Reader Service Card



FASTER set-ups and positioning

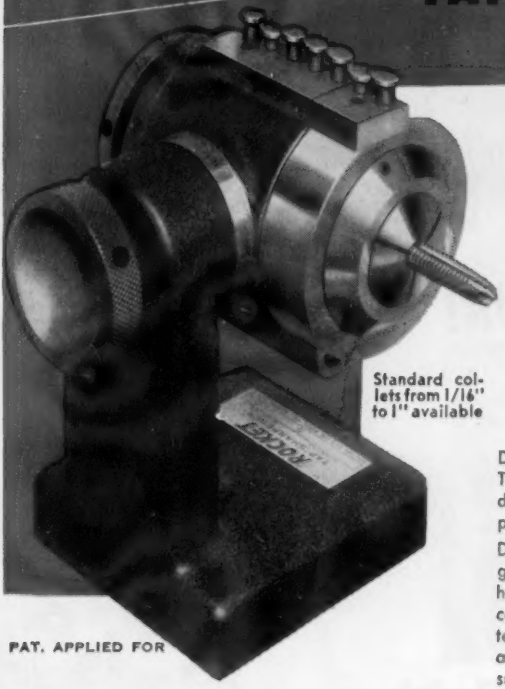
You save set-up and positioning time with Gilbert rotary tables. *Hand-indexing:* 36″ and 50″ square or round. *Power rotary* and *power feed:* 36″, 50″, 60″, and 72″ square or round. Special tables built to your requirements. For complete descriptions and specifications, *write for Bulletin 854.*

THE CINCINNATI **GILBERT** MACHINE TOOL COMPANY • CINCINNATI 23, OHIO

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sharpen dull taps swiftly, economically, and accurately

# THE Rocket TAP SHARPENER



PAT. APPLIED FOR



Standard collets from 1/16" to 1" available

## *A low Cost*

**fixture that sharpens dull taps to like new condition**

Don't dispose of dull taps! THE ROCKET TAP SHARPENER can save you many dollars in new tap investment — will pay for itself in no time at all.

Designed to do a high precision job of grinding 2, 3, or 4 flutes, right or left hand taps, straight or spiral, the ROCKET carries an unqualified company guarantee of satisfaction. It can be used on any make of tool and cutter grinder or small tool room surface grinder. Simple to operate — no maintenance.

Start reducing tap cost today — examine the ROCKET TAP SHARPENER.

**There's a ROCKET sales representative in your area. We will be glad to direct him to you for a demonstration of this unit. Literature is available upon request.**

**ROCKFORD DIE & TOOL WORKS, INC.**

**1816 Seventeenth Ave. • Rockford, Illinois**

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# WHICH DO YOU DO?

LOADING & UNLOADING

SHEET FEEDING

WORK POSITIONING

DIE HANDLING



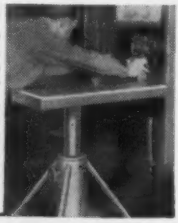
RAYMOND

PORTABLE

ELEVATING TABLE

## FITS ALL FOUR!

No table has so many practical uses as this RAYMOND Portable Hydraulic Elevating Table! Use it for positioning or handling throughout the plant . . . see how it lightens your work load. RAYMOND Hydraulic Elevating Table has sturdy 30" square top which can be rotated when desired.



Convenient foot pump simplifies raising and lowering, leaves operator's hands free. Smooth-rolling casters make table highly portable. Floor lock holds it securely in place. Standard Model elevates from 28" to 44"; Telescopic Model from 28" to 50". Both models have 2,000 lb. capacity.

**The RAYMOND CORPORATION**

8837 Madison St., Greene, N.Y.

Please send me Bulletin 233 on your Portable Elevating Table.

NAME _____ TITLE _____

COMPANY _____

STREET _____

CITY _____ STATE _____

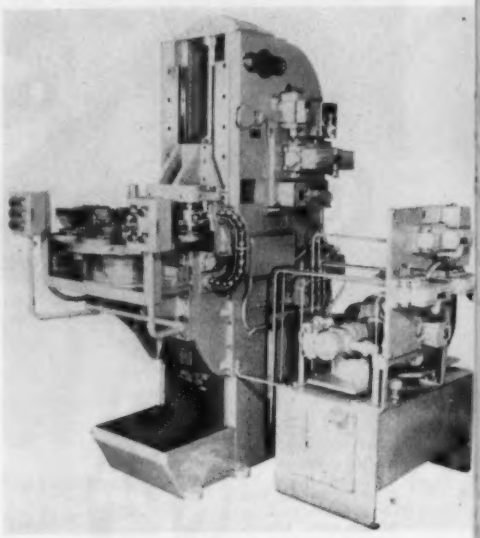
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*new shop equipment . . .*

## BROACHING MACHINE ASSEMBLES AND BURNISHES 400 PARTS PER HOUR

The American Broach and Machine Co., Ann Arbor, Mich., has designed and built a six-ton 24 inch stroke vertical push-down broaching machine called the American T-6-24. The machine has been tooled to assemble bushings into cover parts and burnish in a continuous operation. With a 6 second cycle and based on 100 per cent efficiency, 400 complete parts per hour can be produced.

The machine shown in the accompanying illustration is completely electrically controlled and hydraulically operated from a self-contained pump and tank unit. Tooling consists of a two-station push head, special dial-type index unit for carrying the cover parts through the separate operations, ma-



*American 6-ton Push-Down Broaching Machine*

# ANGLE TOOLS?

## BUCKEYE builds all types!

DRILLS

NUTRUNNERS



**NEW**
90° angle head nutrunners, reversible. Standard head illustrated; also available with short coupled head.

SCREWDRIVERS

There's a Buckeye angle tool for every drilling and fastening job—including yours. No matter how special your requirements, you're sure to find a Buckeye angle tool exactly suited to your work. Choose from almost 500 types, models and speeds—all described in our Catalog A-10.

**Buckeye Tools**
CORPORATION
DIVISION 17 • DAYTON 1, OHIO

producers of the world's first successful rotary air tools

For more data circle **416** on Reader Service Card

gazine and transfer slide for feeding bushings, and magazine and return for burnish balls.

The machine cycles as follows: Cover parts are loaded, either automatically or manually, at front of table; table indexes clockwise to assembly station where bushings are fed onto the part; machine ram moves down to press fit bushing into the cover part and returns to position; table indexes the completed assembly to burnishing position; and burnishing ball is forced through bushing simultaneously with new assembly at the first station.

For more data circle **100** on Reader Service Card

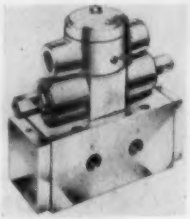
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## SOLENOID AND AIR VALVES

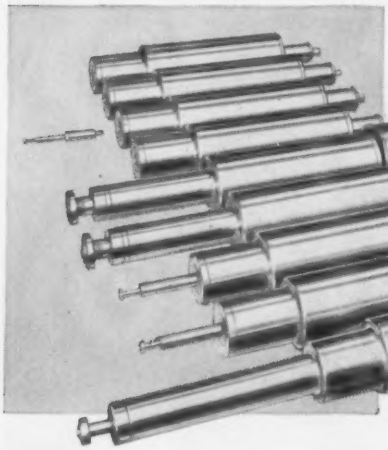
Hanna Engineering Works, 1758 Elston Ave., Chicago 22, Ill., has announced the development of a new series of solenoid and master air valves. These valves are used for three and four way air operation, and are available in sizes of ¼, ⅜, ½, ¾ and 1 inch.

Hanna Flo-Line Valves are used for controlling air cylinders and other air operated devices. Dependable performance, safe operation, easy maintenance and clean cut design are advantages offered by these valves.

Efficient service is assured by seals which eliminate



*Hanna Flo-Line Valve*

**STANDARD**
**SUPER-PRECISION**
**Spindles**
**LEAD THE**
**WAY IN**
**INDUSTRY!**

Makers of more than 800 different Super-Precision Spindles for **ORIGINAL EQUIPMENT MANUFACTURERS, REBUILDERS AND USERS**

**STANDARD** Super-Precision Spindles represent the ultimate in rugged construction, trouble-free maintenance and adaptability. In use on a thousand jobs in industry the nation over. Every Standard spindle is "checked out" electronically in our sound-, vibration-, dust-proof laboratory before approved for delivery. Write today for catalog.

**Booth 1047—METAL SHOW**
**Cleveland — Oct. 8-12**

**SINCE 1912**

**the STANDARD electrical tool co.**
**SUPER-PRECISION SPINDLE DIVISION**
**2487 RIVER RD. • CINCINNATI 4, OHIO**

HALLMARK OF METALWORKING THROUGHOUT THE WORLD

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# *New!* Kearney & Trecker's "Bull's-Eye" Control Grouping



Available under Tool-Lease program

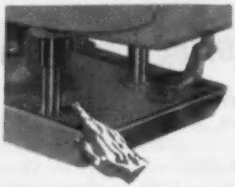
**TF Series milling machine's controls are grouped up-front for "bull's-eye" accuracy . . . measurably reduce operator fatigue**

One look tells why the new TF Series milling machines — Plain, Universal and Vertical—are so easy to operate. "Bull's-eye" up-front control grouping permits operators to achieve exact settings faster, more adeptly and with greater ease than ever before. This "Fron-Trol" convenience is the key to low-cost production...because it increases the operator's efficiency and measurably reduces fatigue through elimination of wasted steps.

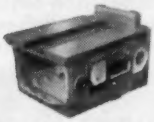
The "bull's-eye" knee and saddle-mounted controls are safety-interlocked and include feed selection, directional Mono-Lever table feed and rapid traverse, automatic cycle table feed and rapid traverse controls, front-mounted table handwheel, saddle clamping gib and backlash eliminator, and hand and power directional controls for knee and saddle movements.

New TF's are built in five sizes — No. 2 to No. 6 from 10hp to 50hp. You can get all the facts on TF Series machines from your Kearney & Trecker representative — or write direct to Kearney & Trecker Corp., 6794 W. National Ave., Milwaukee 14, Wis. Ask for Catalog No. TF-50.

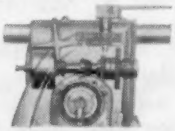
**A few more of many reasons why TF Series milling machines are so easy to operate**



Twin Screw Knee Support — Exclusive double-support arrangement most effectively distributes weight of machines' much wider, heavier knee, saddle and table. This balanced design substantially increases stability under heaviest loads . . . offers greater resistance to torsional thrust under all cuts . . . assures greater, longer-lasting accuracy.



Heavier, Wider Knee—*Twin Screws* support the one-piece, larger knee. Span and length of ways is increased considerably, providing greater saddle support . . . longer-lasting accuracy . . . reduction of way and gib wear.



Three-Bearing Spindle — Complete assembly consists of three heavy-duty bearings, flywheel, a train of wide-faced forged steel gears. Rigidity of spindle unit contributes to increased cutter life . . . quieter, vibrationless operation.

KEARNEY & TRECKER
MILWAUKEE
DESIGNERS AND BUILDERS OF
PRECISION AND PRODUCTION MACHINE TOOLS SINCE 1898



Massive Column — Solid back, double-box section column is scientifically ribbed throughout to rigidly withstand heaviest cutting forces. Full bearing column face affords maximum support for the knee. Cross-mounted motor assures maximum ventilation, easy access for routine inspection.

For more data circle **418** on Reader Service Card

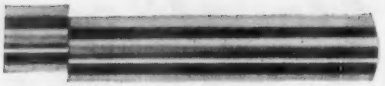
damage from external grit and moisture. Few moving parts and materials such as aluminum, brass and stainless steel were selected for lasting performance. The bubble tight aluminum spool is sealed positively by "O" rings. According to the manufacturer, parts subject to wear are replaceable without the possibility of assembling the valve incorrectly.

For more data circle **101** on Reader Service Card

★ ★ ★

## JUMP EDGE FINDER

Glover Manufacturing Co., 422 Park Ave., Meadville, Pa., has announced its jump edge finder. The finder will locate holes to a 0.0003 inch tolerance in one minute. Both halves are 0.500 inches in diameter with all surfaces hardened and ground. The company's edge finder is available with the 0.200 inch diameter end that is necessary for small pieces and where location of holes is from cavities under ½ inch wide.



*View showing Glover Jump Edge Finder*

For more data circle **102** on Reader Service Card

★ ★ ★

## CIRCULAR SAW BLADE SHARPENER

The Motch & Merryweather Machinery Co., 1250 E. 222nd St., Cleveland 17, Ohio, has announced a blade sharpener, the G-45, which is designed to sharpen blades from 8 through 45

★ ★ ★ ★ ★




**cut weld cleaning time by 85%**

Throw away your cold chisel and whisk off weld spatter with a dry rag! Protect-O-Metal spatter-proofing compounds make weld cleaning a breeze. Improve your welds at the same time . . . P-O-M compounds quiet the arc, improve fusion and electrode operation, prevent oxidation and annealing scale, cause no porosity. No smoke odors, or fumes.

**P-O-M No. 2.** Non-inflammable, non-toxic water-soluble paste. Inorganic. Thin before applying and start welding at once. $3.30 per gallon, f.o.b. Dayton.

**P-O-M No. 8.** Rust- and corrosion-resistant resin base compound. Comes ready to use. Safe for all metals. Good paint primer; permits outdoor storage of subassemblies. $3.35 per gallon, f.o.b. Dayton.

**MONEY-BACK TRIAL OFFER**

Order a trial gallon of each today for testing in your shop. We'll cancel the bill if you're not satisfied.

**PROTECT-O-METAL**

**G. W. SMITH & SONS, INC.**

**5407 KEMP ROAD, DAYTON, OHIO**

For more data circle **419** on Reader Service Card




# YESTERDAY...

**Planes and Taps were only good for short runs**





# TODAY...

the cutting characteristics and life of your taps are important factors in your costs of production.

BLAKE Flute and Chamfer Grinders can make substantial savings possible in your threaded-hole costs. They do this by creating or restoring:

1. Exact indexing of cutting edges.
2. Efficient rake angles for each job.
3. Correctly ground spiral points.
4. Perfectly relieved chamfers.

The accuracy and dependability of the Blake Flute Grinder and Blake Chamfer Grinder make it possible for you to do high-efficiency tapping . . . the *only* kind which pays off in profits today!

*Send for the details now.*

**EDWARD BLAKE COMPANY INC.**

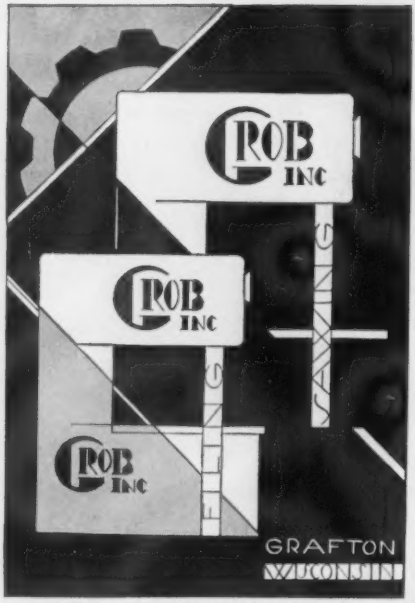
MANUFACTURERS OF FLUTE AND CHAMFER GRINDERS

438 CHERRY ST., WEST NEWTON 65, MASS.

**Exclusive Distributors of:**

BLACK DIAMOND PRECISION DRILL GRINDERS • SURFACE FINISH STANDARDS • WORCESTER DRILL GRINDERS

For more data circle **420** on Reader Service Card




For more data circle **421** on Reader Service Card

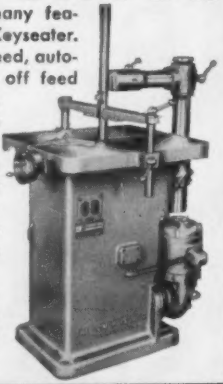
inches in diameter. The grinder features the ability to grind alternating high and low teeth with one setting. The high tooth is chamfered on either side and the following tooth is square. The narrow tooth roughs out the center and the wide tooth finishes the cut. As a result, three curling chips are formed by two teeth.

The grinding contour on the work is automatically produced by cam action with index plates controlling the tooth spacing. Varying diameters, thicknesses, rake angles, and pitches can be ground with the variable automatic saw sharpener.

For more data circle **103** on Reader Service Card

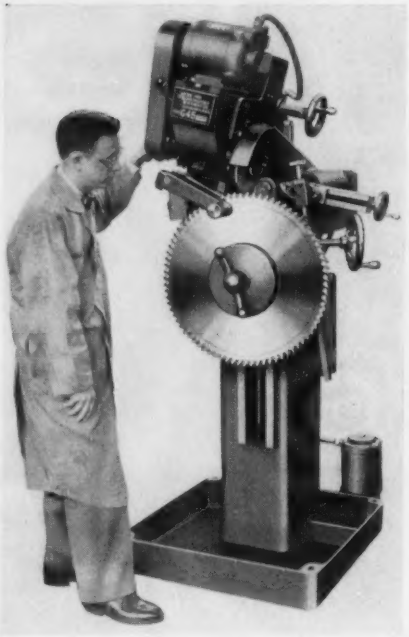
**MORRISON 1"**
***AUTOMATIC***
**KEYSEATER**

Investigate the many features of this new Keyseater. It has automatic feed, automatic stop to cut off feed at given depth, automatic relief to back the work away from the cutter, automatic centering, automatic lubrication and no bushings required.
Write for more information on the finest Keyseater on the market.



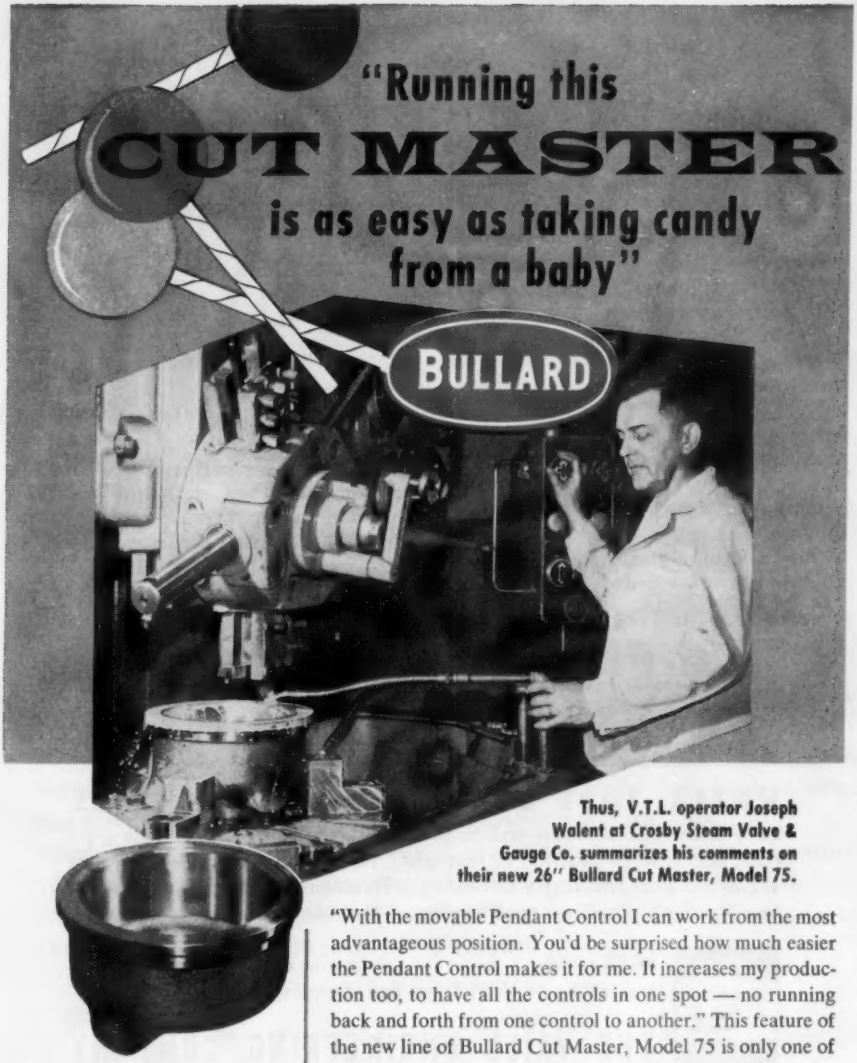
**THE D. C. MORRISON CO.**
P. O. BOX 10178 • CINCINNATI 1, OHIO

For more data circle **422** on Reader Service Card



***View showing Motch and Merryweather G-45 Circular, Variable Saw Blade Sharpener***

# "Running this CUT MASTER is as easy as taking candy from a baby"




**Thus, V.T.L. operator Joseph Walent at Crosby Steam Valve & Gauge Co. summarizes his comments on their new 26" Bullard Cut Master, Model 75.**

"With the movable Pendant Control I can work from the most advantageous position. You'd be surprised how much easier the Pendant Control makes it for me. It increases my production too, to have all the controls in one spot — no running back and forth from one control to another." This feature of the new line of Bullard Cut Master, Model 75 is only one of many reasons why you should have them in your plant.

Why not get the full story — ask for a catalog by calling your nearest Bullard Sales Office, Distributor or write

THE BULLARD COMPANY
BRIDGEPORT 9, CONN.

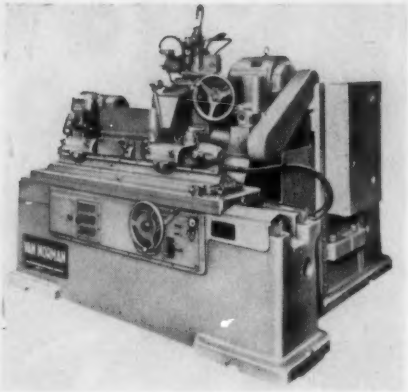
For more data circle **423** on Reader Service Card.

## SINGLE HEAD PLUNGE CUT PRODUCTION GRINDER

Van Norman Machine Co., Springfield 7, Mass., has announced the 4B61 single head plunge cut Bowgage production grinder which features the exclusive Bowgage wheelhead unit. This completely automatic integral grinding unit with gauging, rough and finish feeds, and automatic cycle with rapid traverse is said to increase production, save time and cut costs.

By simply taking the Bowgage wheelhead and mounting it on a suitable base, there is practically no limit to the number of diameters, tapers, shoulders and so on, that can be ground to close tolerances, automatically.

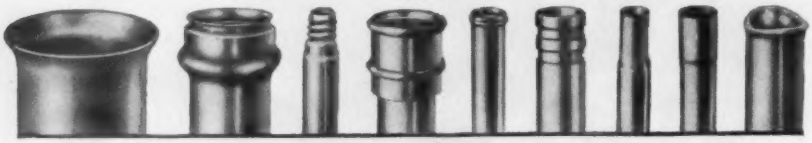
The operator loads the workpiece, pushes the start button and the machine takes over performing all the operations and then stops automatically for removal and reloading of work. This 4B61 is available in two sizes—10 x 24 inches and 10 x 36 inches.



*Van Norman Bowgage Production Grinder*

For more data circle **104** on Reader Service Card

★ ★ ★ ★ ★

**VAILL TUBE END-FORMING MACHINES**

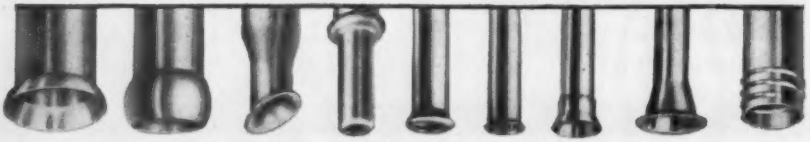
have hundreds of tube end-forming and shaping applications . . . Fast, accurate production at less cost. Beading • Flaring • Flanging • Sinking • Expanding • Grooving • Threading • Reducing • Double Lap Flaring • Double Lap Flanging. **On tubing up to 6 in. diameter.**




**FREE**—New Bulletin T-1 shows and describes the versatility of Vaill Tube End-Forming Machines.

**THE VAILL ENGINEERING COMPANY**

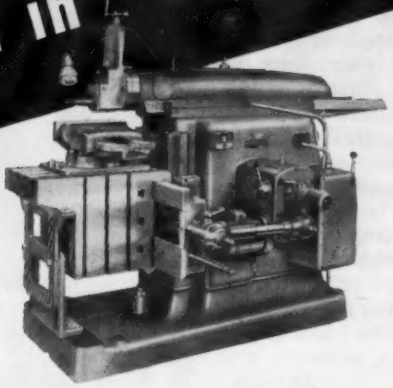
133 E. MAIN STREET • WATERBURY 20, CONNECTICUT



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VMA

...the finest in shapers!



*18", 22", 26"*
*Heavy Duty*

**Superb Swedish craftsmanship, plus fine design and construction backed by 50 years' experience, makes the VMA Shapers outstanding production and toolroom machines.**

**The standard and heavy duty models cover a range from 14" to 26" stroke length and are available optionally with swiveling or universal table, automatic tool post feed and automatic tool lifter. Table power rapid traverse and foolproof automatic pressure lubrication are standard on heavy duty models. Drive through anti-friction bearing transmission, hardened chrome nickel steel gears and double helical tooth crank gear are some of the quality features which contribute to VMA's stamina, dependability and smooth operation.**

*Prompt delivery — Attractive Price — Write for Folder!*

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76-H MAMARONECK AVE., WHITE PLAINS, N. Y.

*Dealers in principal cities*

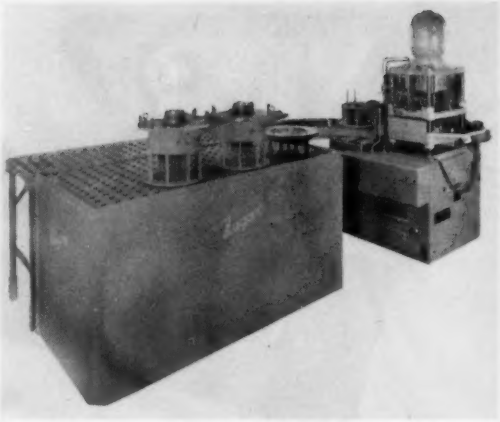
**Look for the Austin Seal — your full guarantee of satisfaction!**

For more data circle **425** on Reader Service Card

## MULTIPLE SPINDLE DRILLING MACHINE SOLVES TOOL CHANGE AND STORAGE PROBLEMS

Zagar Inc., 23898 Lakeland Blvd., Cleveland 23, Ohio, has announced a multiple spindle drilling machine. It has been designed for changing, limited and intermittent production, particularily when multiple hole drilling is recommended as the low-cost solution in hole drilling. The small four-post unit houses 24 inch Zagar hydraulic drill heads.

The basic unit has been designed so that changing of heads and tooling can be performed easily. The head is changed by dropping the drill head on a loading basket. Each head is carried on its own loading basket, which is rolled on a conveyor and onto the roller table. The only other act required to change the head is to remove and replace the bushing plates and locators.

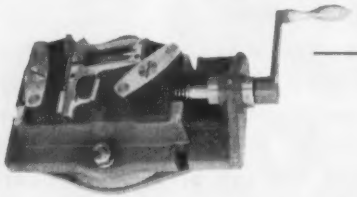


*Zagar Multiple Spindle Drilling Machine*

The roller table serves as storage for

★ ★ ★ ★ ★

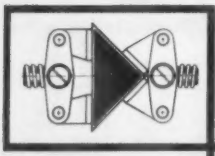
*ENGINEERED FOR ALL YOUR TOUGH JOBS*



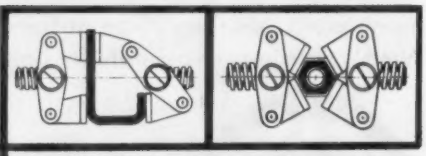
**the POLYP**

**CLAMP and CLAMPMASTER**

*Holds Odd and Irregular Shaped Parts*

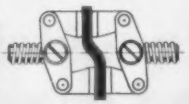


Now—a practical holding device of unlimited application in tool rooms, repair shops and factories for use on machine tools, on assembly lines, or on the work bench!



POLYP Universal Clamp has free swinging jaws.

The jaws of the POLYP Clampmaster can be locked in any predetermined position.



The POLYP Clamp combines precision, ruggedness and versatility. Only POLYP gives you four perfectly balanced pressure points which evenly distributes the holding force, assuring sufficient gripping power, even when clamping delicate parts. Various sizes available.

*For more complete details write Dept. M-8.*

**FIREARMS INTERNATIONAL CORPORATION**

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# Logan

- 12" SWING
- 1" COLLET CAPACITY
- 1⅝" SPINDLE BORE
- 23" and 35" CENTERS
- VARIABLE SPEED OR DOUBLE V-BELT DRIVE

## ACCURACY, CAPACITY AND POWER COMBINED IN THIS 12" LATHE

This 12" swing lathe typifies Logan advanced design and rugged construction. Gears are extra wide and strong. Shafts are extra heavy. The lead screw has a full ⅞" diameter. The precision carriage rides on a two-V-way, two-flat-way bed that is rugged, precision ground and warp-free. The heavy spindle turns on oversize ball bearings, no bearing adjustment needed for any speed between 38 and 1575 rpm. This lathe, and every Logan Lathe from 14" swing down to 9" swing, is dynamically balanced before it is shipped. The result is *sustained accuracy* and smooth, quiet power on every lathe turning operation. See your Logan Lathe dealer for more facts—or mail us the coupon below.



No. 2557-V
12" Swing,
Variable Speed Drive
35" Centers

**THIS COUPON**
will bring you full details on Logan Lathe construction and specifications.

**LOGAN ENGINEERING CO.**
4901 West Lawrence Avenue, Chicago 30, Ill.

Send me full facts on the Logan line.

Name.....

Company.....

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For more data circle **427** on Reader Service Card

the heads in loading baskets, and the empty loading basket for the head affixed to the drilling unit. Any number of heads appropriate to the drilling unit can be stored, thus making it possible to drill almost countless hole patterns and any number of holes within a given area. The drill heads drill holes simultaneously and varying diameters of holes in the same workpiece can be handled by one head.

For more data circle **105** on Reader Service Card

★ ★ ★

## MOBILE COOLANT DISPENSER

Transporting and dispensing coolants, hydraulic and cutting oils or solvents can be swiftly accomplished by one man without the usual spillage with the CeCOR mobile dispenser, announced by the Coolant Equipment Corp., Verona, Wis. The easy to handle tank unit, mounted on 12 inch rubber tire or 30 inch steel wheels, has a capacity of 80 gallons and is available with hand or electrically operated 15 g.p.m. pumps.

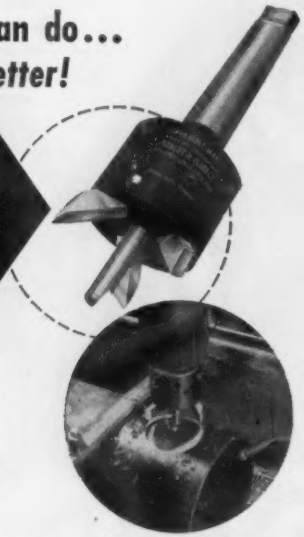
One or two-way pumps may be specified on all models and the electrically operated Model 210 is also available



*CeCOR Mobile Coolant Dispenser*


**Does jobs no drill can do... Does many jobs *better!***

**Clark "HOLE-MAKER"**



**Produces round, true holes in CASTINGS, FORGINGS, BOILER PLATE, THIN SHEET STOCK, PIPE, TUBING, ETC.; Drills CROWNED, CYLINDRICAL, FLAT OR WEBBED SURFACES!**

No triangular shaped holes, no grabbing on break-throughs, no "walking" on starts with the Clark "HOLE-MAKER"! Produces full-gauge holes from start to finish. Removable pilot guides HOLE-MAKER straight and true even on intermittent cuts. Will also use pilot drill.

Ideal production tool on TURRET LATHES, CHUCKING MACHINES, RADIAL DRILLS, DRILL PRESSES, PORTABLE ELECTRIC and PNEUMATIC DRILLS. Excellent for rough boring, finishing and trepanning. Cuts all ferrous and non-ferrous metals and other materials. Saves money, replaces large drill inventory... Bores castings, forgings, etc. 3 to 10 times faster than single pointing!

**5 ADJUSTABLE SIZES COVER I.D.'s from 1" to 6"**

Specify straight shank or MT 2, 3, 4. Other tapers on order.

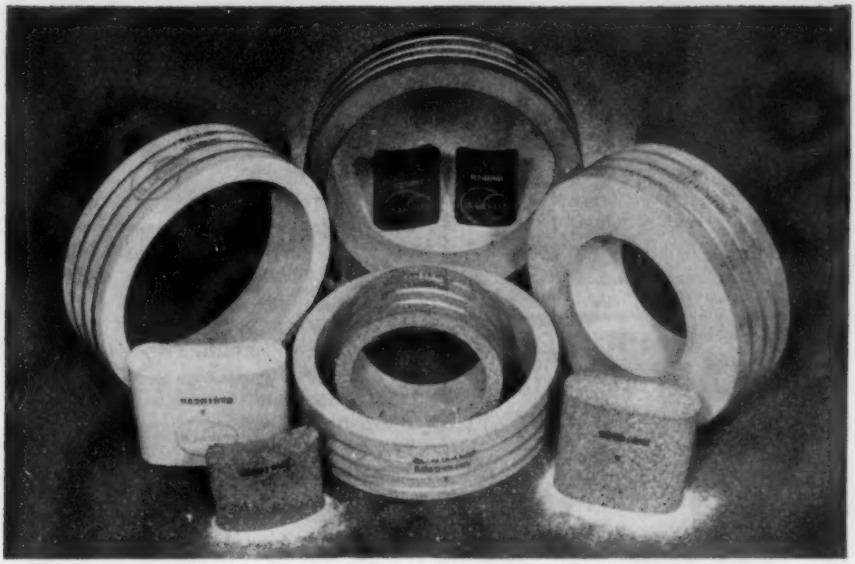
| MODEL | CAPACITY |
|---|---|
| 102 | 1"—2" |
| 203 | 2"—3" |
| 304 | 3"—4" |
| 405 | 4"—5" |
| 506 | 5"—6" |

*When ordering, specify material to be cut.*

**ROBERT H. CLARK COMPANY**

**9330 Santa Monica Blvd., Beverly Hills, Calif.**

For more data circle **428** on Reader Service Card





## Here's why Blanchard Wheels are best for Blanchard grinding

Almost thirty years ago, Blanchard began developing and manufacturing better grinding wheels for Blanchard Surface Grinders. Our research first produced silicate bonded wheels, and then resinoid bonded wheels.

Today, Blanchard offers silicate, resinoid and vitrified bonded wheels . . . scientifically manufactured and accurately graded in our modern wheel plant.

Use Blanchard Wheels on your Blanchard Grinders. The correct wheel gives you peak production and economy on each job . . . whether the work is tough as copper or fragile as glass, whether it requires heavy roughing cuts or precision grinding within .000010" of absolute flatness and surface finish of 1 micro-inch.

*PUT IT ON THE* BLANCHARD

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**THE BLANCHARD MACHINE COMPANY** 64 State St., Cambridge 39, Mass. MMS

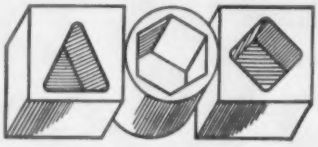
Please send "The Art of Blanchard Surface Grinding" (3rd Ed.)

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**DRILL THESE HOLES**
**BY A QUICK, EASY, INEXPENSIVE METHOD**
*Your business letterhead will bring literature.*
**WATTS BROS. TOOL WORKS**
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**STANDARDIZED MICRO DRILL GUIDES**

All standard body styles available with hole sizes from #80 to 3/32". Tolerances of .0002 maintained on I.D., O.D., and concentricity.

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**MICRO DRILL GUIDE**

JEDCO

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FLAT BOTTOM **WOODRUFF KEYS**

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**KEYS—ALL TYPES • COTTER PINS**
**TAPER PINS • STRAIGHT PINS**
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*KOOLHEAD Foundry Chill Nails*

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Since 1872 NEW BRIGHTON, PA.

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with valving which permits the mixing of liquids within the tank. Stainless tanks, larger tank capacities or multiple compartment tanks are also available. The Model 220 (hand operated) can be equipped with gallon stroke or diaphragm pump. Gasoline powered or air motor driven pumps are available in place of the standard electrically driven pump.

Anti-splash baffles within the tank contribute to handling ease as well as provide reinforcement. This mobile liquid dispenser is especially useful in plants where aisles are crowded or narrow as it turns in a 48 inch circle.

For more data circle **106** on Reader Service Card

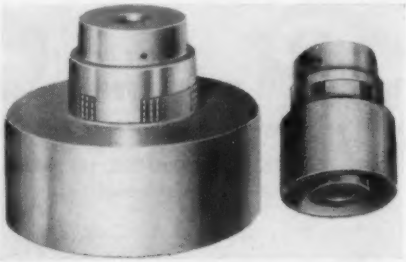
★ ★ ★

## FLEXIBLE COUPLING WITH BRAKE DRUM FLANGE

Lovejoy Flexible Coupling Co., Dept. MSC, 4801 W. Lake St., Chicago 44, Ill., has designed a new type coupling incorporating a brake drum flange on the outer diameter.

This feature provides a compact drive arrangement and is particularly useful where shaft length or distance between two units is at a premium. In effect, the brake drum entails no more space than required by the coupling.

The new brake drum coupling is available in eight standard sizes, with



*Views showing Lovejoy Flexible Coupling*

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*through cost savings . . . on*
**DIES • TEMPLATES • CAMS**



**Oliver** DIE MAKING MACHINES

***Eliminate the necessity for outlining unusual shapes by drilling and chipping. Result? . . . greatly reduced tool costs.***

The Oliver method utilizes power contour sawing, reducing filing to an absolute minimum. Table tilt also produces clearance for die work while filing. Files, saws, lapping sticks and hones can be used interchangeably.

*Heavy-Duty Model illustrated. Four bench and pedestal type machines also supplied. Write for full details.*

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FACE MILL GRINDERS • AUTOMATIC DRILL GRINDERS • DIE MAKING MACHINES
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For more data circle **433** on Reader Service Card

horsepower ratings from 2 to 40 at 1,750 r.p.m. Maximum bores of the hub body range from 1 to 2½ inches. Drum body bores are made to motor shaft size specifications. Distance between shafts runs from ½ to 1⅝ inches. Cushions are one-piece spider type.

For more data circle **107** on Reader Service Card

**HARGRAVE CLAMPS**
*A Complete Line of Clamps for all Purposes*

Individually Power Tested for Better Performance.

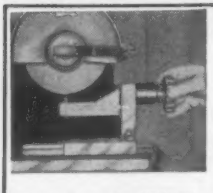



"C", Steel Bar, Quick Acting, Wood Hand Screws, Welders

**WRITE FOR FREE CATALOG.**
Showing Clamps, Chisels, Punches, Masonry Drills for hand and power hammers. Carbide Drills, Washer Cutters, and File Cleaners.
*Stocked by Your Local Distributor.*

**THE CINCINNATI TOOL COMPANY**
**1947 Waverly Ave., Cincinnati 12, Ohio**

For more data circle **434** on Reader Service Card



NEW 1956 MODEL "SS"
**RADIUS DRESSER**
**outperforms them all**
Cut production time without sacrificing accuracy! Easy to set, easy to see, eliminates necessity of guard removal. Somerset Radius Dresser turns "tricky" jobs into routine operations.

**At new low price $124.50 with diamond.**

***Write for free illustrated folder.***

**SOMERSET TOOL CO.** **320 Virginia St. Hillside, N. J.**

For more data circle **435** on Reader Service Card

## CARBIDE CUTTING ALLOY FOR HIGH VELOCITY MACHINING

Newcomer Products Inc., Latrobe, Pa., has announced an entirely different concept in metallic cutting materials known as NewMet. This metal cutting medium requires no tungsten or cobalt or other strategic materials and its major constituents are molybdenum and titanium. According to the manufacturer the material is extremely hard, easy to braze and practically impervious to cratering and wear.

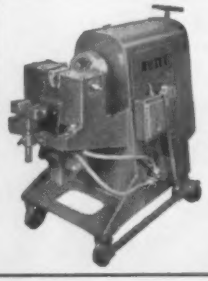
Field tests conducted by the manufacturer show that the material can be run successfully at speeds far beyond the range of present day machines. It is said to be the first high velocity material to be used successfully in milling steel. Because of its flexibility in machining tough metal alloys at very high speeds, it has been especially effective in automotive and aircraft industries.

For more data circle **108** on Reader Service Card

★ ★ ★

## HIGH SPEED ATTACHMENT FOR SURFACE GRINDERS

Boyar-Schultz Corp., 2020 S. 25th Ave., Dept. F-L, Broadview, Ill., has announced a high speed grinding attachment for use with surface grinders; for the grinding of angles or slots too small to permit the use of standard size grinding wheels; grinding serrations, T-slots and many other hard to



***for chamfering bar stock***
PRIOR TO SCREW MACHINE OPERATIONS
**The KENT BAR POINTER**

Entirely self-contained. Manual or pneumatic operated feed and gripping mechanism. Capacity ⅜" minimum diameter up to 2¼" hexagon. Stationary and portable.

***Literature available.***

**The KENT MACHINE CO., Cuyahoga Falls, O.**

***Drillers . Threaders . Slotters . Countersinkers . Bar Pointers***

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# *In stock* 400 sizes of 21 standard CLEVELAND PUNCHES!

For your convenience we carry 400 sizes of our 21 standard punches and matching dies in stock. Punching diameters range from $\frac{5}{32}$" to $1\frac{1}{2}$". You will get prompt shipment of any standard punch. Special sizes or shapes will be made to your specifications.

Don't overlook the savings offered by the Cleveland system of standardization. You can punch any size hole from $\frac{1}{8}$" to $1\frac{1}{16}$" by using the same coupling nut and punch stem.




*Are you obtaining maximum service from your Punches and Dies? Protect tool life—send for copies of our two-color wall instruction chart, "Proper Care of Punches and Dies."*
A-5169

THE CLEVELAND PUNCH & SHEAR WORKS CO.
U.S.A.
Established 1880

PUNCHING TOOLS & DIES
FABRICATING TOOLS
POWER PRESSES
CLEVELAND 14, OHIO

OFFICES AT:
NEW YORK . . . CHICAGO
DETROIT . . . PHILADELPHIA
E. LANSING

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Advertisement

## Screw Machine Attachment Eliminates Secondary Marking Operations

Automatic die marking of part numbers, patent numbers, trade marks, etc., during the operating cycle of automatic and hand operated screw machines, bench and turret lathes, etc., on almost any surface of a part is possible with the complete line of automatic roll markers available from New Method Steel Stamps, Inc., 147 Joseph Campau, Detroit 7, Michigan.

Suitable for both light and heavy work, the markers are practically foolproof and eliminate the need for separate setups for marking, thus reducing cost, scrap, etc. Quick interchangeable roll dies give remarkable versatility and reduce time for setup changeover.



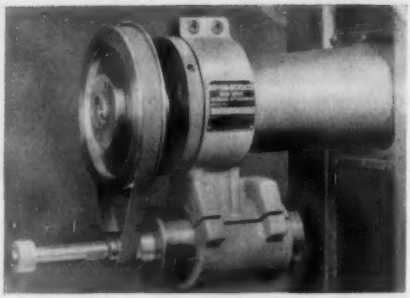
Model 500-C for automatically marking on outside cylindrical surface of screw machine parts, manufactured by New Method Steel Stamps.

New Method marking units are being used in leading screw machine shops throughout the country to mark millions of parts annually at costs of a fraction of a cent per part.

Illustrated is one of the three basic models of the cost cutting markers. Model 700 (not shown) is for marking and cutting off at the same time. The marker occupies the cutoff slide, leaving other stations open for machining operations. New Method also manufactures a complete line of hand stamps, inspectors' stamps, embossing dies, marking hammers, type and type holders, etc. Precision marking and engraving services available.

**For complete information and descriptive bulletin, write New Method Steel Stamps, Inc., 147 Joseph Campau, Detroit 7, Michigan.**

For more data circle **438** on Reader Service Card



*View of Boyar-Schultz Grinding Attachment*

reach surfaces. It provides higher spindle speed (14,000 r.p.m.) and is also used for grinding small radii and contours in die blocks or other parts requiring this type of grinding.

The attachment mounts on the surface grinder spindle in a matter of minutes. Belt tension is adjusted through the use of the eccentric bushing. The spindle is equipped with permanently lubricated, preloaded ball bearings.

For more data circle **109** on Reader Service Card

★ ★ ★

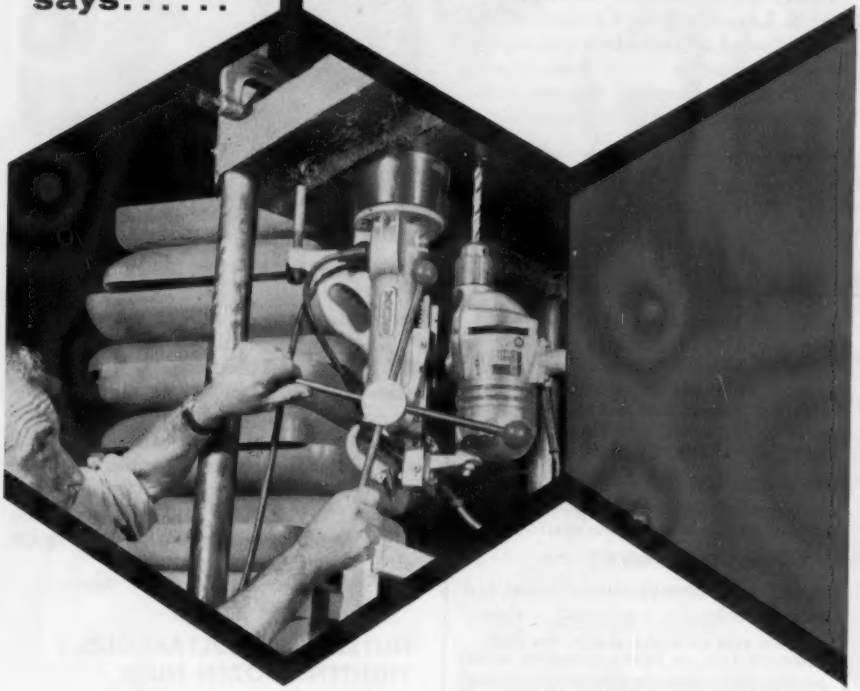
## NON-OIL EXUDING COMPOUND

Bischoff Chemical Corp., 105 Main St., Ivoryton, Conn., has announced the recent development of a special non-oil exuding compound called Thermo-Cote N-4. It is designed for specific applications such as masking surfaces in plating or etching operations and has a unique water-white clarity which facilitates the cutting of the mask. Its uses are varied including the protection of many materials other than metal. Due to its non-oil exuding feature it is applicable to a great many materials that may be harmed by contact with oil. This tough, high tensile strength compound can also be used as a components, having been successfully employed as such by electrical and electronic manufacturers.

For more data circle **110** on Reader Service Card

**KOCH FIBERGLAS says:.....**

## "With our Bux, we now do 8 hour drilling jobs in 2 hours!"



"At our plant in Corte Madera, we save six man hours on tough overhead drilling jobs, thanks to our Bux," says John Daly, Machine Shop Foreman. "It used to take two men 8 hours to drill 90 9/16" holes in platens to make die changes. Now with our Bux model L-2 portable magnetic drill press, 2 men do the job in less than 2 hours! In the first month's use, we more than paid for our Bux. Around here we never take a job to the drill—we always take our life-saving Bux to the job." The experience of the world's largest manufacturer of fiberglas luggage is like that of every efficient shop using a Bux drill press. Why not call your local Bux dealer for a money-saving demonstration right now!

See Bux tools in action at the 1956 National Metal Exposition, Space 2546, Cleveland Public Auditorium Oct. 8-12, 1956.

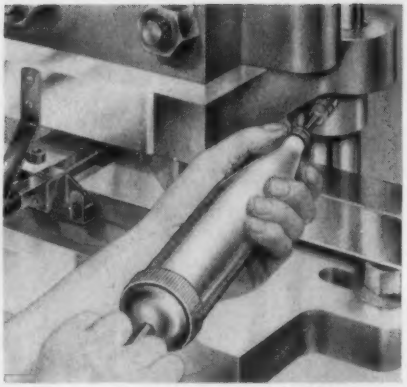
**BUX**
magnetic products

**BUCK MFG. CO.**
100 Roberts Rd., Los Gatos, California

For more data circle **439** on Reader Service Card

## DIE SET LUBRICATION GUN

Danly Machine Specialties, Inc., 2100 S. Laramie Ave., Chicago 50, Ill., has marketed a lubrication gun making die set lubrication easier than ever before. The long shape of the gun makes it simple to reach guide post bushings from the front or side of the press.



*Danly Heavy-Duty Die Set Lubrication Gun*

The nozzle regularly furnished with the gun is designed for use with oil or grease. A complete set of operating instructions is included with every gun.

From the standpoint of construction, the lubrication gun features a close-fitting high pressure steel piston which is carefully ground and polished. The lubrication cylinder is of heavy gage steel to withstand hard use.

For more data circle 111 on Reader Service Card

★ ★ ★

## NUTSETTER SIMULTANEOUSLY TIGHTENS DOZEN NUTS

The accompanying illustration shows a twelve-unit multiple nutsetter, designed to tighten simultaneously a doz-


*Lewthwaite*

**FRONT LEVER BENCH PUNCHES**



• These hand operated punches are particularly popular because the die cannot lose alignment with the punch, and because the lever pulls to the front, allowing the operator to see what he is doing at all times.

65 sizes of round, flat, oval, and square sizes of punches and dies are carried in stock for these machines.

Weight: 76 pounds.

68 years of experience goes into every Lewthwaite tool—and it shows!

**SEND FOR CATALOG SHEETS ON OUR COMPLETE LINE OF METAL-WORKING TOOLS**

**T. H. LEWTHWAITE MACHINE CO.**

317 East 47th St. • New York 17, N. Y.

For more data circle 440 on Reader Service Card



*Now Available in . . . "SPRAY ON" CANS and in "BULK"*

**CROWN design layout ink**



*Just Press the Trigger on the Can*

Order it the way you use it — in handy 12-oz. Aerosol spray cans, or by the pint, quart, gallon or barrel in bulk! Crown ink dries to an excellent scribing texture in a minute! Ideal for pattern, "OK" or "reject" marking.

*Contact your distributor, or write:*

**CROWN INDUSTRIAL PRODUCTS CO.**

809 Amsterdam St., Woodstock, Ill.

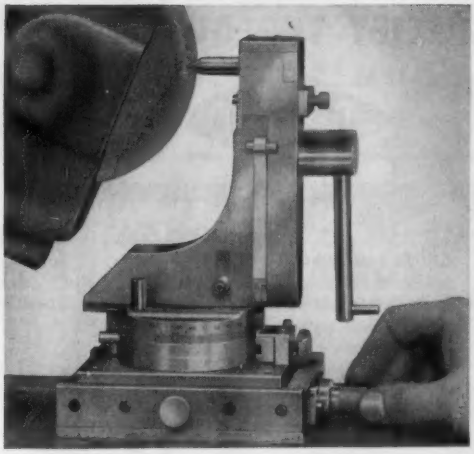
For more data circle 441 on Reader Service Card

# Tough Grinding Wheel Forms Dressed Easy as A, B, C

**eliminate elaborate set-ups and operations**

**.0001" ACCURACY**

*Fluidmotion*
**WHEEL DRESSERS**
dress two angles tangent to a radius in one continuous motion



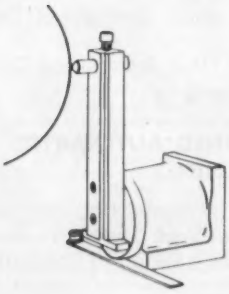
With the unique "Fluidmotion" Dresser, you can dress two angles tangent to a radius — using one handle in one continuous motion. Operation is so fast and simple that beginners can use them.

Adaptable to all type cylindrical and surface grinders.

A. Obtain micrometer reading; add required convex radius or subtract required concave radius.

B. Loosen jib with wrench and "mike" over lower pins to reading obtained above.

C. Tighten jib. Set stops for two angles. Ready for action.



Also available: "FORM MASTER" Dresser, capable of dressing any radii up to 12" convex, up to 15" concave. Prices start at

**$45.00**

**WRITE FOR INFORMATION ON THE NEW J & S PURCHASE PLAN**

*See your industrial distributor or write for free literature.*

WHEEL DRESSERS J&S TOOL CO. INC. JAW CLAMPS • PRECISION VISES • DOWN-HOLDING DEVICES **CLAMPCUT** ONE EACH

**J & S TOOL CO., INC.**

**871 DORSA AVE.**
**LIVINGSTON, NEW JERSEY**

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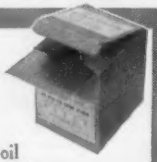
## SPECIFY TOP QUALITY

DE-STA-CO

**ARBOR SPACERS**
**SHIMS and SPACING COLLARS** • Arbor Spacers and Shims in 20 sizes and thicknesses from .001″ to .125″. Arbor Spacers furnished with standard keyway; Shims, with no keyway. Also Spacing Collars in numerous popular diameters, and in thicknesses from 1/8″ to 3″. Hardened and ground; edges chamfered. Furnished with standard keyway.



**FEELER STOCK** • Made from tempered stock, rolled to close tolerances, 1/2″ x 25′ coils packaged in transparent plastic boxes, except above .020″. Strips 1/2″ x 12″, in cellophane. 27 thicknesses. All thicknesses from .001″ to .032″. (For use in precision fitting, checking clearances, inspection and production work.)

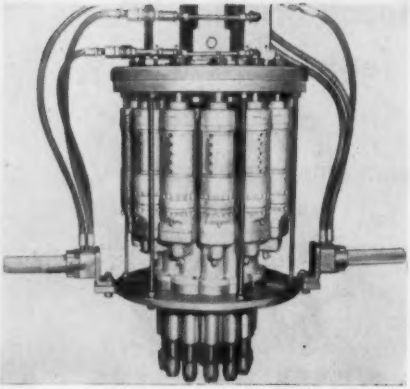


**SHIM STOCK** • Steel or brass. Selected from material rolled to precision limits, free from burrs, and protected by oil coating. Coils packed in carton for easy dispensing and protection. 15 thicknesses, .001″ to .032″. Sheets 6″ x 12″; coils 6″ x 120″. Available also in two assortment packages—12 thicknesses, .001″ to .015″, and 15 thicknesses, .001 to .032″.

WRITE FOR DE-STA-CO Illustrated Brochure and Price List!



**DETROIT STAMPING CO.**
349 MIDLAND AVE., DETROIT 3, MICHIGAN
For more data circle **443** on Reader Service Card

*View of Thor Twelve-Unit Multiple Nutsetter*

en nuts to predetermined torque. It is one of the newest multiple-spindle air tools engineered and built by Thor Power Tool Co., Aurora, Ill. A principal feature of the unit is the use of offset spindle nutsetters, arranged in a compact 6 5/8 inch working circle, to meet the requirements of a major motor car manufacturer for setting differential housing nuts. Scores of multiple units are being designed and built by Thor to speed various phases of assembly operations in modern automotive and industrial plants throughout the United States.

For more data circle **112** on Reader Service Card

★ ★ ★

## NEWLY DESIGNED AUTOMATIC MILLING MACHINES

The Aaron Machinery Co., Inc., 45 Crosby St., New York 12, N. Y., has introduced two new Pedersen line milling machines.

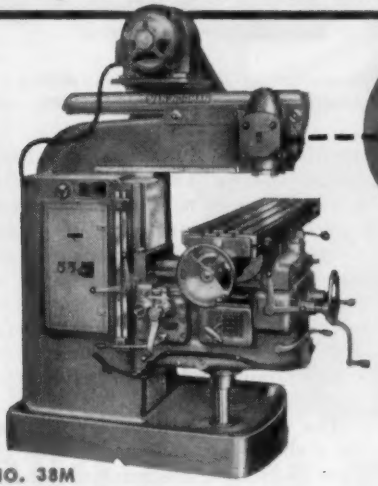
The Model VPU-0 is an intermediate machine, built for average capacities and embodying all of the automatic features of heavier milling machines. Automatic feeds in three directions are a standard feature.

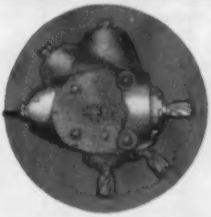
The heaviest of the milling machines,

# VERSATILITY

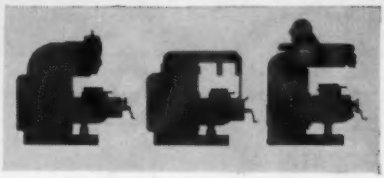
## of VAN NORMAN Millers Saves Your Machine Dollars...

### *One Van Norman Ram Type Miller Gives You the WORKABILITY of TWO Single Purpose Machines PLUS Angular Milling*





**Van Norman exclusive adjustable cutterhead permits horizontal, vertical or angular milling on one machine without attachments.**



Vertical Milling  Horizontal Milling  Angular Milling

**NO. 38M**

Table Size: 64" x 14"
Spindle Cutterhead motor: 10 HP
Ram Travel: 29" — Speeds: 12 — Feeds: 18

Regardless of the type of plant or type of work, a Van Norman Ram Type Miller can cut your milling costs and speed production. These versatile millers reduce idle machine time by as much as 50%.

But that's not all — with a Van Norman you save on capital expenditures, too! Here's how — with one Van Norman Ram Type Miller you can do horizontal, vertical as well as angular milling without attachments . . . all on *one* machine. This means less machine purchase dollars needed, more overall production from each miller because there is *no waiting* for single purpose machines.

**You do them all on one Van Norman Ram Type Miller**

Find out how you can profit with a Van Norman Ram Type Miller. They are available in 14 basic models . . . a size to meet your particular requirements.

Write for full information, today.

*Don't wait . . . for extra profits, install a Van Norman now! They are available on many purchase plans — Outright sale . . . Purchase on conditional sales contract up to 5 years . . . Pay as you depreciate. See your dealer or write Van Norman Company.*

*Conditional Sales Contracts not available to Export.*

## VAN NORMAN MACHINE COMPANY

SPRINGFIELD 7, MASSACHUSETTS

***Manufacturers of*— Ram and Column Type Milling Machines, Cylindrical Grinders, Spline and Gear Grinders, Oscillating Radius Grinders, Special Production Grinders, Centerless Grinders.**

For more data circle **444** on Reader Service Card

MARK OF QUALITY

**STANDARD**

**WOODRUFF KEYS**

We manufacture a complete line of Woodruff keys in all standard sizes. These sizes range from as small as 1/2" x 1/16" to keys as large as 3½" x ¾". All keys are carefully checked for burrs, slivers, etc., before being shipped to you. Only the finished tested keys are permitted to leave our plants.

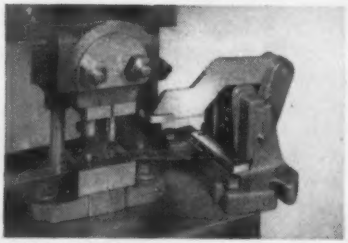


We carry a complete stock of high quality, dependable keys. Send for our catalog for complete information on Woodruff keys, taper pins, machine keys, and machine racks.

**STANDARD STEEL SPECIALTY CO.**
BEAVER FALLS • PENNSYLVANIA
*Plants:* Beaver Falls, Pa.; Hammond, Ind.

For more data circle **445** on Reader Service Card

***economically priced press room equipment***



**DURANT Ram Scrap Chopper**

Operated by press ram, independent of the die; tool steel blades — only two bolts to install.

FOUR MODELS

M1 up to 3" width and .062 thickness

M2 up to 6" width and .062 thickness

M3 up to 10" width and .100" thickness

M4 up to 12" width and .100 thickness

WRITE FOR NEW FREE CATALOG

**DURANT Tool Supply Co.**
PROVIDENCE 3, RHODE ISLAND

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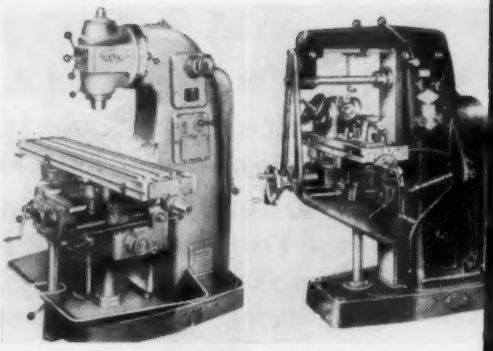


*Illustration of Pedersen Line Milling Machines: Model VPV-2, (left); VPU, right*

the Model VPV-2, incorporates rugged design features. The vertical spindle of this machine is supported by a heavy tapered roller bearing and the spindle sleeve may be moved 3 inches in axial direction and locked securely in any position desired. The spindle head may be swiveled to each side by the operator and is provided with a graduated scale with a nonius and a simple fine adjustment device.

The table and slides are lubricated by a shot type system operated by a lever on front of the machine. The gear boxes are automatically lubricated.

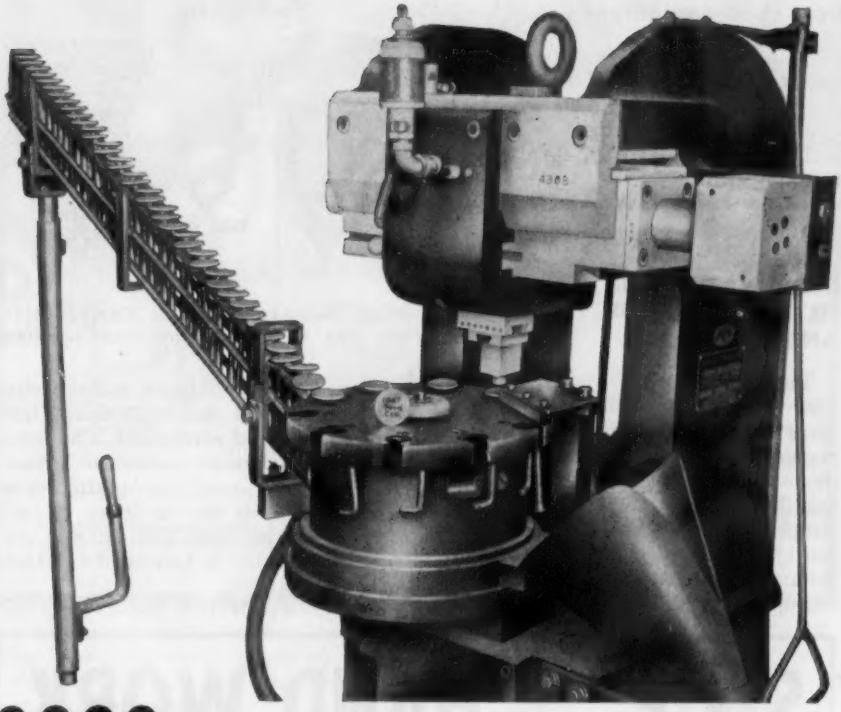
For more data circle **113** on Reader Service Card

★ ★ ★

## HIGH SPEED HAMMER DEVELOPES RIVET SPINNER FOR AUTOMATION

A new noiseless spinning riveter head, designed for special production line automation set-ups has been announced by the High Speed Hammer Co., 500 Norton St., Rochester 21, New York.

Adapted from the company's standard floor and bench model rivet spinners, the new unit is air-actuated with the spinner itself motor driven. Special



# 3600 marking operations per hour

This GTS machine, equipped with a Dial Feed, marks 3600 automotive engine valves per hour. The Dial picks up valves from the inclined chute, positions them for marking, marks and discharges them into the funnel. The Dial Feed is hydraulically operated through the machine circuit.

This is only one member of the extensive and ever-growing line of GTS marking devices. Whatever *your* marking problem may be, you can be sure of a rapid and entirely satisfactory solution from GTS.

Write today, without obligation, for further information, or for an appointment with a helpful GTS Sales Engineer.

**GEO. T. SCHMIDT, INC.**
1806 West Belle Plaine Avenue
Chicago 13, Illinois

***"IF IT'S WORTH MAKING, IT'S WORTH MARKING"***

For more data circle **447** on Reader Service Card

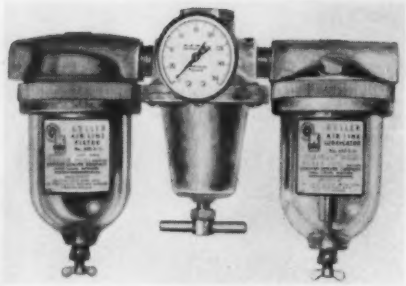
engineering has provided flexibility and simplicity of mounttng in a variety of applications. Rivet capacity is to 5/16 inch; spindle travel is ¾ inch; adjustable downward.

For more data circle **114** on Reader Service Card

★ ★ ★

## COMBINATION AIR LINE FILTER, REGULATOR AND LUBRICATOR

The Keller Tool Division, Gardner-Denver Co., Grand Haven, Mich., has designed and marketed an air line filter, regulator and lubricator. The device drains from the bottom without removing the bowl. This is accomplished by simply opening the ¼ inch bottom bowl fittings for fast cleaning of the filter and lubricator. The pressure regulator operates in an inverted position to permit a more compact, space-saving installation that can be designed into any air-powered equipment. The regulator gauge has an unbreakable face. It is available in any combination or as individual units for ⅜, ½ or ¾ inch compressed air line. The exterior surface of all units is furnished in Hammerloid gray.

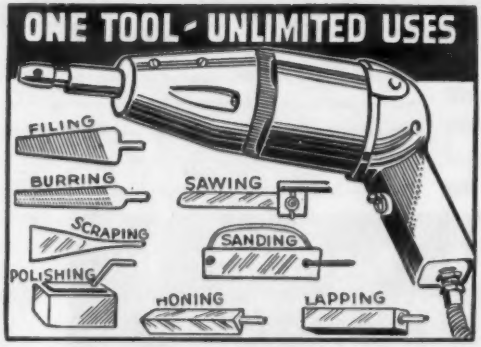


*View showing Keller Tool Combination Air Line Filter, Regulator and Lubricator*

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# STOP . . . HAND WORK

**Use these Handy PORTABLE ELECTRIC RECIPROCATING TOOLS for Greater Production, Better, More Uniform Work — All with less Operator Fatigue. Fixed strokes are 1/8" or 3/8" long. Operate on 110 volts AC-DC. Deliver 1000 PUSH-PULL strokes per minute.**



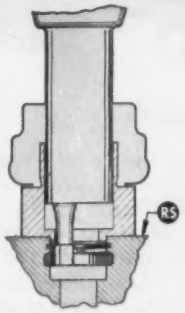

*Try one of these tools on your next job.*

**ACME TOOL COMPANY**

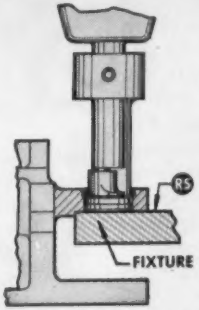
**73 WEST BROADWAY** **NEW YORK 7, N. Y.**

For more data circle **448** on Reader Service Card

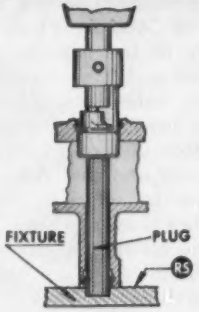
# Even Unskilled Labor Can Use This Versatile Tool Accurately! It Simplifies Internal Grooving Problems, Cuts Production Costs!




A) Cuts two grooves of different depths and widths in one single operation from same reference surface.




B) Cuts groove in bore located in protruding member of workpiece. Reference surface on under side of protrusion.




C) Cuts grooves in two bores of different diameters from same reference surface. Tool banks on reference surface. Then workpiece is reversed and tool banks on plug.



**Amazingly versatile!** Your toughest recess cutting problems can be met simply and efficiently with the Waldes Truarc Grooving Tool because it offers a whole range of possibilities beyond the range of ordinary recessing tools.

**Wide Cutting Range!** The Waldes Truarc Grooving Tool comes in 5 models...enabling you to cut accurate grooves in housings with diameters from .250 to 5.00 inches.

**Send Your Problems to Waldes!** Send us your blueprints...let Waldes Truarc Engineers give you a complete analysis, price quotation and delivery information on the most economical tool set-up for your particular job. There is no obligation!

Write NOW for a 20-page manual containing full information on Waldes Truarc Grooving Tool



**WALDES TRUARC® GROOVING TOOL**

Made by the Manufacturers of Waldes Truarc Retaining Rings
WALDES KOHINOOR, INC., 47-16 Austel Place, L. I. C. 1, N. Y.
Waldes Truarc Grooving Tool Manufactured Under U. S. Pat. 2,411,426

Waldes Kohinoor, Inc., 47-16 Austel Pl., L.I.C. 1, N. Y.

Please send me your new 20-page technical manual on the Waldes Truarc Grooving Tool. MM-108

Name_____

Title_____

Company_____

Address_____

City_____ Zone_____ State_____

For more data circle 449 on Reader Service Card

*new shop equipment . . .*

## STEEL WORK BENCHES

Equipto Division of Aurora Equipment Co., 606 Prairie Ave., Aurora, Ill., has announced several additions to its line of Modern Flow work benches. Many of the benches feature double drawer sections, drawers and cabinet, double cabinets and enclosed storage space beneath the work surface. The selection of models, all with matching contours and dimensions, enables customers to select the exact types of benches they need and to group them in one continuous streamlined assembly. Four different types of tops are available including 12 gauge steel, masonite covered steel, laminated wood, or resinwood.

The recent additions feature: tank-strong construction that enables bench

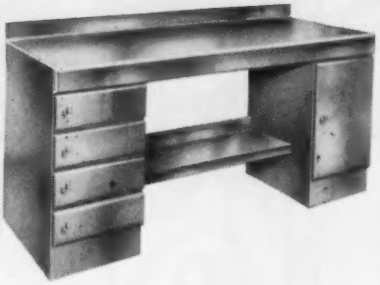


*Illustration showing Equipto Work Bench*

to support punch presses, drill presses, grinders, lathes, vises, knock-outs for electrical outlets, lower ledge to hold plugged-in power tools, tapered legs for extra toe room, risers to prevent objects from falling off bench and rounded edges to prevent tears in clothing or injury to worker.

For more data circle **116** on Reader Service Card




CUT PRODUCTION COSTS!

MARK

NAME PLATES

5 TIMES FASTER

—WITH—

Automark

ELECTRIC TAG MARKING MACHINES

MODEL EMT-1

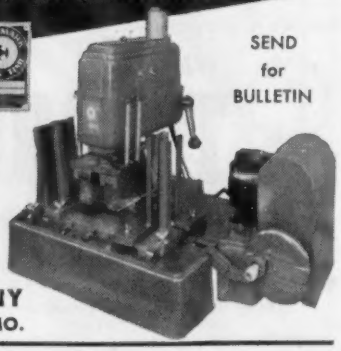
ELECTRIC TAG TYPEWRITER

A touch of the finger delivers up to 2 tons pressure for deep, legible impressions in plastic or metal tags.

MODEL SRST-2

HI-SPEED TAG MARKING MACHINE

Automatically marks BOTH constant and serial numbers at any desired speed up to 8,000 tags per hour!



SEND for BULLETIN

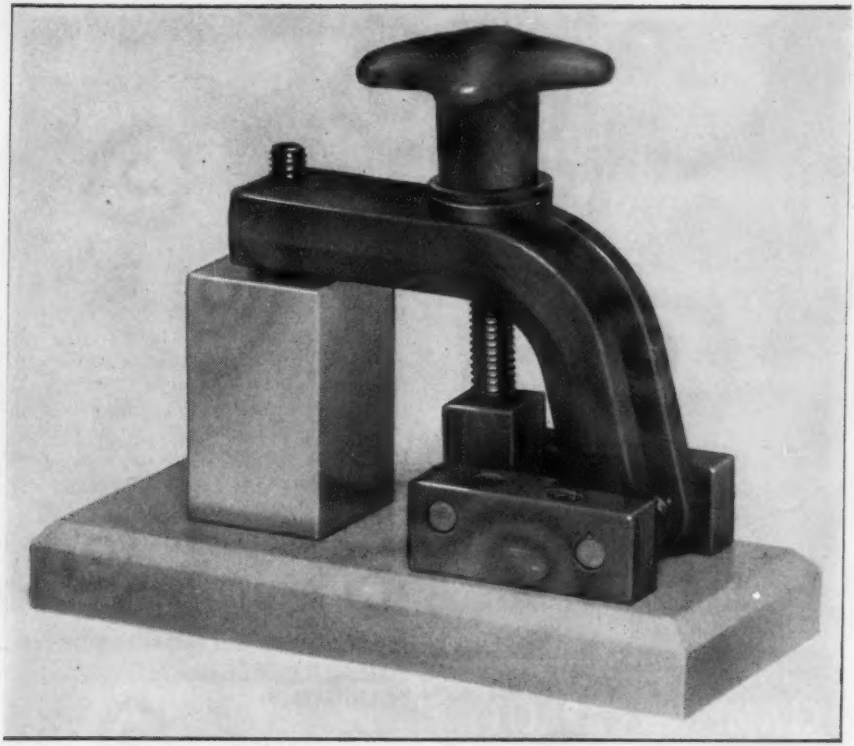
MANUFACTURERS' AGENTS

Some Territories Still Available

DEFIANCE MACHINE & TOOL COMPANY

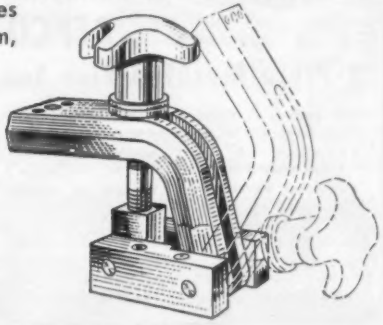
1920 S. VANDEVENTER • DEPT. MM • ST. LOUIS 10, MO.

For more data circle **450** on Reader Service Card



# LODDING RETRACTING CLAMPS

Lodding Retracting Clamps lend themselves to infinite variation. Jaws are added to suit work. Tapped and clear holes are there for you to use. Lodding provides four types of action — and your own imagination is the limit to the variety of jaws you can add. Four sizes each of four styles—hand knob, hand cam, nut and air operated.



## LODDING, INC.

Worcester 1, Massachusetts

FACTORY WAREHOUSES

| | |
|---|---|
| Precision Tool Sales | Bagby Engineering Co. |
| 417 E. Florence Ave. | 1047 Forest Ave. |
| Los Angeles 3, Calif. | Evanston, Ill. |

For more data circle **451** on Reader Service Card



The Leading Machine Tool Manufacturers use

**RUTHMAN GUSHER**

COOLANT PUMPS

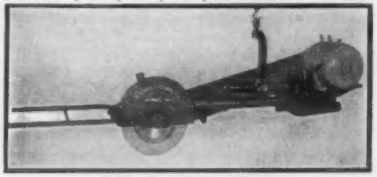
THE RUTHMAN MACHINE CO.

Model UL 7120

For more data circle 452 on Reader Service Card

**MUMMERT-DIXON SWING FRAME GRINDERS**

Sizes 12", 14", 16", 18", 20" and 24" wheels.



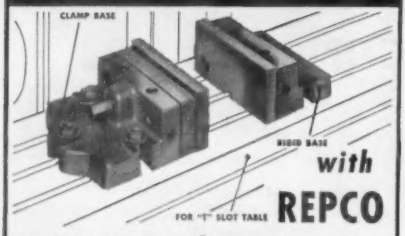
*Ask for Descriptive Circular*

MUMMERT-DIXON CO.

120 Philadelphia St. • Hanover, Pa.

For more data circle 453 on Reader Service Card

**INCREASE AVAILABLE CLAMPING CAPACITY**




*with*

**REPCO**

**2-Piece Machine Vise Set**

Cuts costs . . . supplements use of one-piece vises. Machined for precision accuracy.

- Two Sizes — 6" and 8" widths. Depth 2½". T-Slot center distances: 2¼" - 2¾", 2¾" - 3¾".
- Greater Versatility — useable as general purpose vise, as an angle block, as separate clamping device.

Write for Bulletin 100 - Dealer Inquiries Invited

ROCKFORD ENGINEERED PRODUCTS CO.

2324 23rd Avenue • Rockford, Illinois

For more data circle 454 on Reader Service Card


## *new shop equipment . . .*

### RUST PREVENTIVE BASE IS MISCIBLE WITH WATER

A multi-purpose rust preventive base which can be mixed with water, solvent or oil, or used neat, has been announced by E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia, Pa. Identified as Rust Veto M.P., this water displacing rust preventive base has a wide range of uses for indoor protection. When mixed with water, it provides a safe, non-flammable emulsion with high stability and excellent protection value. It can be used to replace dangerous solvents or similar flammable slushes and is especially economical when mixed with water.

For more data circle 117 on Reader Service Card

★ ★ ★

### SPECIAL PRODUCTION MACHINE FOR HEAT EXCHANGE EQUIPMENT

Michigan Drill Head Co., Detroit 34, Mich., has announced a special machine for use on heat exchangers and condensers. It is designed to drill all the tube holes in a tube sheet, for a heat exchanger. And, the tube sheet, which is SAE 1020 Boiler Plate, is completely drilled with just one setup. This new machine will handle a wide range of tube sheet sizes—from a sheet 8 inches in diameter, and 1¼ inches thick; to one 54 inches in diameter and 2 inches thick. The same clamping jaws can be used for all sizes of tube sheet.

The machine has a 20-spindle drill head, in line, with fixed center, as shown in the accompanying photograph. It's built, largely, of standard Michigan components. A standard hydro 20 column assembly is mounted on




# It's the *steel* in ACE drill bushings!

**TWO YEAR SECRET *STEEL* FORMULA ASSURES LONGER DRILL BUSHING LIFE...**

If you are one of the many ACE drill bushing users who have told us about the *extra-long bushing life* you have been getting from our drill bushings—we *thank you*...and *now* we are going to tell you why!

More than *two years ago* ACE, without telling anyone and without raising costs, began making shipments of drill bushings made of a special high-carbon chromium bearing steel! With this new oil-hardening steel coupled with an exceptionally high degree of precision in the heat treating process, ACE engineers found that bushing life was increased tremendously. Rather than make an announcement at that time...we hoped that user comments would prove the importance of the new steel—and they certainly have! From all parts of the nation ACE drill bushing users have told us about the much longer life they have been getting...how production costs from both a material and labor standpoint have dropped sharply. Now...the secret is out...it's the steel!

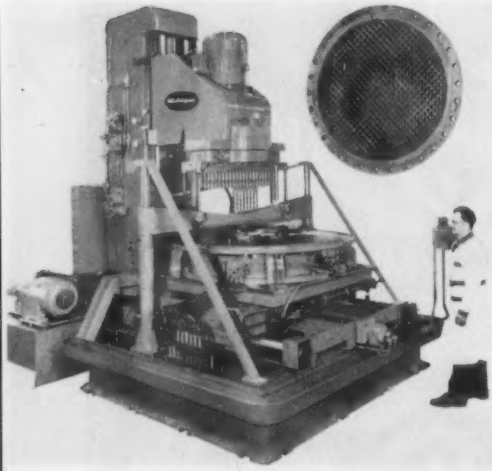
***Look to ACE for Quality...Accuracy...Largest Deliverable Stocks Anywhere!***

*Write* TODAY *for the all-new 1956 catalog containing technical data, comparison tables, price lists and name of dealer in your area.*

ACE

**ACE DRILL BUSHING CO., INC.**
5407 Fountain Ave., Los Angeles 29, Calif.

For more data circle **455** on Reader Service Card



*Special Michigan Production Machine*

a special base. A standard 60 inch hydraulic index table, with 180 degree indexing, is mounted on a 60 inch square spacing table. This spacing table permits 57 position spacing; 42 from front to back; and, 15 from left to right. All positioning is power operated, by means of selector switches. The machine is built to J.I.C. hydraulic and electrical standards with automatic lubrication throughout.

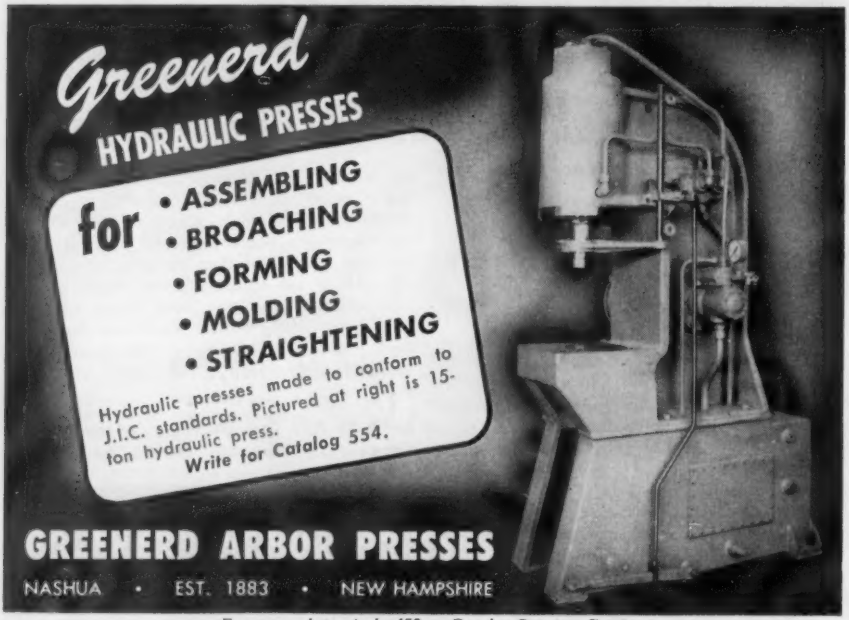
The machine cuts production time as much as 3 to 7 days, depending upon the size of tube sheet being drilled. Production time varies from 3 per hour, for the 8 inch size; to 3 per day, for the 54 inch size.

For more data circle **118** on Reader Service Card

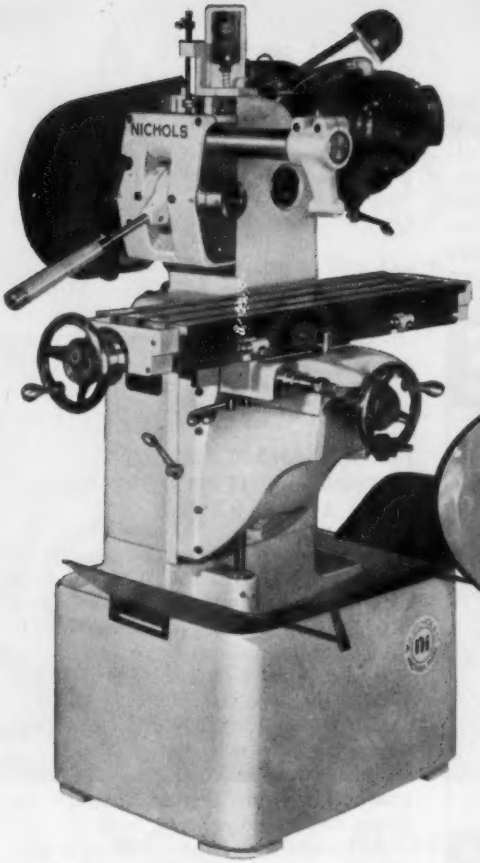
★ ★ ★

## GAGE HANDLES AND BLANKS

Huron Machine Products, P.O. Box 146, 6252 Monroe Blvd., Dearborn, Mich., has announced a complete line

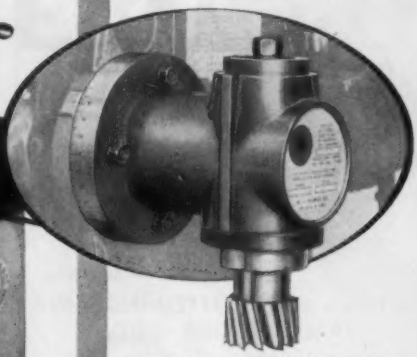



For more data circle **456** on Reader Service Card




# THE *Nichols* TOOL ROOM MILLER

*"the miller that uses its head!"*



A valuable accessory is the Nichols Heavy-Duty Vertical Milling Attachment. Takes full 1½ H. P. up to 2000 R. P. M. (So precise, some shops use it for jig boring!)

**CONDENSED SPECIFICATIONS**

| | |
|---|---|
| Table Working Surface | 8½" x 30" |
| Longitudinal Travel | 19" |
| Transverse Travel | 7" |
| Vertical Travel—Knee | 13½" |
| Rise and Fall of Spindle | 4½" |
| Selective Speed Ranges up to 5000 R. P. M. | |
| Weight | 1250 lbs. |

The unusual versatility and extra capacity of this model make it extremely useful for the tool room. Because it is equipped with the "rise-and-fall" spindle, it can perform not only conventional precision milling, but also facing boring, key seating, contour milling and other operations. Both longitudinal and transverse feed screws are fitted with hand wheels and extra-large adjustable micrometer dials with easy-to-read graduations. This model is especially useful because of its compactness, generous capacity and ability to handle a wide variety of work to close tolerances —*to "tenths" when desired!*

*Write* today for Nichols general catalog which describes the six models of Nichols Millers. A sound, color movie, "the Miller that Uses its Head" is available for free showing. May we reserve it for you?



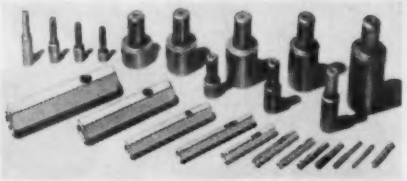
**MANUFACTURED BY W. H. NICHOLS COMPANY • WALTHAM, MASSACHUSETTS**

NATIONAL DISTRIBUTORS **NICHOLS-MORRIS CORPORATION**

76-H Mamaroneck Ave.
White Plains, N. Y.

For more data circle **457** on Reader Service Card

of gage handles, gage blanks and accessories. All gage handles are made to American Gage Design Standards from aluminum and are highly polished to a brilliant luster. The handles are available in taperlock, trilock or reversible wire type styles. The gage blanks are also manufactured in taper-



*View of Huron Gage Handles and Blanks*

lock and reversible styles, from Graph-Mo oil hardening tool steel, already hardened to 62-64 Rockwell. They are stocked in 1/32 inch steps for minimum grinding and lapping.

For more data circle **119** on Reader Service Card

★ ★ ★

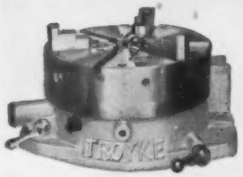
## FLEXIBLE SHAFT SPINDLE ARRANGEMENT GIVES MULTIPLE HEAD ADDED RANGE

Up to six holes can be tapped or drilled anywhere in a 3 x 13 15/16 inch rectangular area with the Ettco-Emrick Model 1000 straight line type flexible shaft spindle multiple head, introduced by Ettco Tool Co., Inc., 598 Johnson Ave., Brooklyn 37, N. Y. Designed to fit any drill press, the Model 1000 can be set in a wide variety of hole patterns; straight line, circular or rectangular. Minimum center distance between two spindles is 5/8 inch.

Adjustability of the spindles is provided by flexible shaft drives, which permit the spindles to be moved in any direction, even while the unit is run-

**TROYKE**

**ROTO-INDEXER**



INDEXING
Rapid
•
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Accurate

**CHUCK or T-SLOTTED INDEXING TABLES—FOUR MODELS**

Hand operated. Unique patented block out arrangement. Can be used in vertical or horizontal position.

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TROYKE MFG. CO.
11,296 ORCHARD STREET
CINCINNATI (SHARONVILLE), OHIO

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**Hardened and Ground Tool Holder Bushings**

These new tool holder bushings are hardened and ground and priced lower than conventional soft bushings. Most sizes in stock for prompt delivery. ¾" to 3½" O.D.—any bore. Send for descriptive literature.

**THE GAHR MACHINE CO.**

SOLID TYPE
19195 ST. CLAIR AVE. CLEVELAND 19, OHIO



SPLIT TYPE

For more data circle **459** on Reader Service Card



**SIOUX** **SIOUX** **SIOUX**

**WISE BIRDS BUY THE TOOL, NOT THE DEAL**—In these days of special price deals, special trade-in deals, and special credit deals, it may seem dull to speak of the wisdom of buying quality tools that last longer. • Are they all bargain hunters? Of course, they are! Do they know what a bargain is? You bet they do! A bargain is the finest, longest lasting piece of precision equipment you can lay your hands on. Price *is* important, but only in relation to quality. If this were not true, there wouldn't be more SIOUX Valve Face Grinding Machines in use than all others combined. If this were not true, the SIOUX reputation for long lasting quality electric tools wouldn't be worth so much. • In the fields we serve, it's gratifying to see that what you have to sell is still more important than what you will do to sell it.

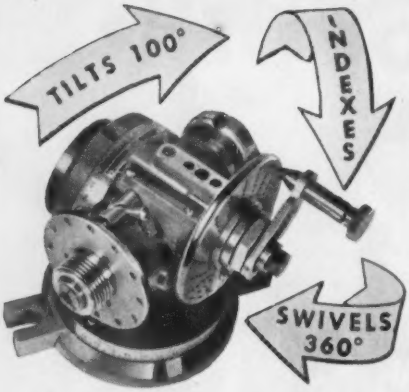
SIOUX

**ALBERTSON & CO., INC.**

SIOUX CITY, IOWA, U.S.A.

ELECTRIC DRILLS • SANDERS • GRINDERS • IMPACT WRENCHES • POLISHERS • PORTABLE SAWS • FLEXIBLE SHAFTS • VALVE FACE GRINDING MACHINES • ABRASIVE DISCS

For more data circle **460** on Reader Service Card




FOR FASTER PRODUCTION

THE **ELLIS**

DIVIDING HEAD

Although it is built to fine instrument standards, the ELLIS is a really *rugged* tool room or production tool that's designed for unusual versatility. Its universal motions — swiveling in two planes — will save time and increase profits and accuracy on your millers, grinders, drill presses and jig borers. It has 6½" swing, or 11" swing when used with riser blocks. Work may be held between centers, or in chucks or collets. To save rehandling of work, and to save money, investigate the ELLIS by writing for complete details!

NICHOLS MORRIS CORPORATION

76-H MAMARONECK AVE.
WHITE PLAINS, N. Y.

For more data circle **461** on Reader Service Card



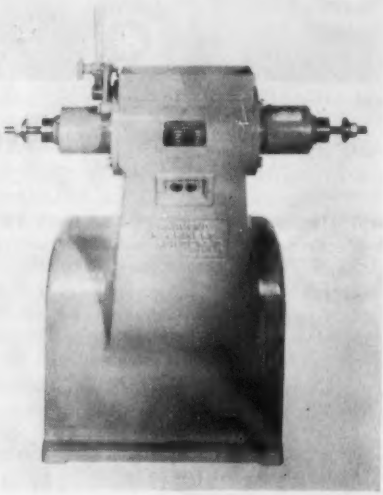
ning. Once spindles are set in the desired position, they are locked in place by means of a spindle adjusting arm. The unit can be used for either drilling or tapping. Conversion from drilling to tapping is accomplished by adding a standard tapping face plate and replacing drill collets with interchangeable floating tap collets.

For more data circle **120** on Reader Service Card

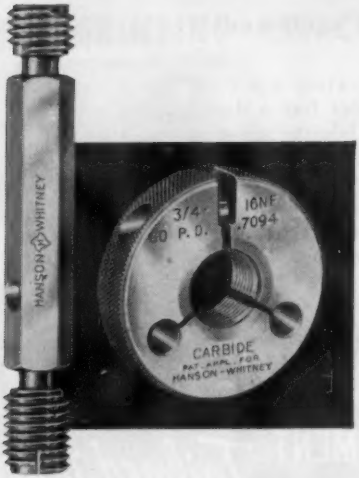
★ ★ ★

## HIGH SPEED LATHE FOR POLISHING PRECISION PARTS

A high speed polishing lathe with shortened spindle, for hand finishing small parts such as automotive, aircraft parts and jet blades, has been announced by Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo, Mich. The lathe, designated as Model 5-ROL, uses a 5 h.p. motor and has a



*Hammond Model 5-ROL High Speed Lathe*






*H-W Thread Comparators. For fast, accurate visual checking.*

**NOW . . . Carbide Gages**
**Quality and Service**
**in the H-W Tradition**

The integrity of your product is assured by use of Hanson-Whitney machine tools, cutting tools, and precision gages for screw threads...engineered and manufactured with **single source** reliability and precision. Hanson-Whitney alone offers **single source** product integrity, your guarantee of production perfection.

Write for further information and literature

# Hanson-Whitney
**COMPANY**

DIVISION OF THE WHITNEY CHAIN COMPANY

**173 BARTHOLOMEW AVENUE • HARTFORD 2, CONN.**

TAPS • THREAD GAGES • HOBS • CENTERING MACHINES THREAD MILLING MACHINES AND CUTTERS

For more data circle **462** on Reader Service Card

speed ranging up to 6,500 r.p.m.

This model has a dynamically balanced, ball bearing spindle, with either flat or multi-V-belt drive and motor mounted inside heavy cast iron base. Drive belts are easily removable and can be replaced without removing or exposing bearings. The unit has a combination brake and switch, operated by a single lever for instantly stopping lathe spindle and cutting off motor current before the brake is applied. In addition to this, the brake also locks the spindle for wheel removal.

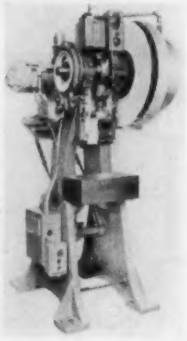
For more data circle **121** on Reader Service Card

★ ★ ★

## HIGH PRODUCTION PRESSES

Zeh and Hahnemann Co., 186-8 Vanderpool St., Newark 5, N. J., has designed and marketed a series of high production presses to meet the demand for automation and increased productivity. The series includes reclinable, straight side and double crank types.

The high production press construction is designed for maximum rigidity with minimum deflection. The relationship of the flywheel to the crankshaft



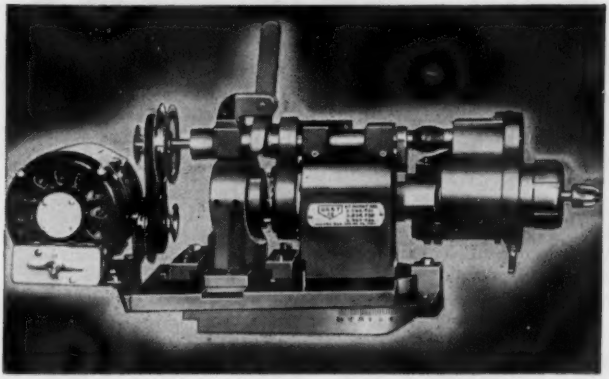
*View of Zeh & Hahnemann Production Press*





For more data circle **463** on Reader Service Card

# *Precision* CIRCULARITY GRINDING ATTACHMENT



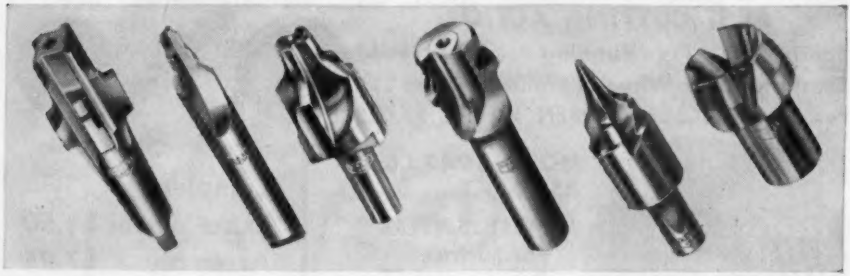


Simple, speedy set-ups on this accurate attachment permit fast and easy grinding of form relief, radial relief, form and radial relief together, tapered cylindrical and straight cylindrical. Cutting tool to be produced or reworked is held in collet or between dead centers and revolves on its own axial center. Where full length of spiral cutting tools is to be ground for both form and radial relief, the Circularity Grinding Attachment travel is similar to an O.D. grinder, which insures fine finish, back taper and accurate size.

The Detroit Reamer & Tool Company Model 500 Circularity Grinding Attachment shown above is faster, easier to handle, has positive control, greater adaptability, rugged construction, and is engineered and precision built to provide the finest in precision work. Therefore, it will be of invaluable assistance to anyone whose tooling standards must meet modern production requirements.

*You Can Grind Tools Like These on a* **DETROIT REAMER CIRCULARITY GRINDING ATTACHMENT**

# *Special Cutting Tools of* DEPENDABLE QUALITY



The Detroit Reamer & Tool Co. Plant is equipped with the finest in modern machinery and inspection facilities to provide you with the ultimate in precision tools. Our Engineering and production personnel with 35 years of empirical knowledge behind them are completely qualified to expertly handle your tool needs. For dependable cutting tools—specify Detroit Reamer & Tool Co.

## DETROIT REAMER & TOOL CO.

**780 W. MAPLE RD. • P.O. BOX 174 • BIRMINGHAM, MICH.**

D R & T COMPANY

For more data circle **464** on Reader Service Card

eliminates bending stresses from the flywheel. This basic design is combined with air clutch and brake, variable speed drive, automatic lubrication, overload protection, adjustable stroke, electro-pneumatic controls. These provide inching, single stroke, continuous run, top stop and instantaneous emergency stop and permits speed ranges up to 600 strokes per minute.

For more data circle **122** on Reader Service Card

★ ★ ★

## NEW LINE OF SPINDLES

The Whitnon Mfg. Co., Rt. 6 and New Britain Ave., Farmington, Conn., has announced a new series of spindles from ½ to 100 h.p.

They range from a few hundred revolutions up to 72,000 revolutions per minute and in size from a 2 ounce, rubber band driven spindle. The spindles are simply and rigidly designed and manufactured. They are built for a minimum amount of maintenance, grease lubricated and sealed for life, according to the manufacturer. A special double end, hollow workhead, internal grinder is used for maintaining the bearing alignment in the housings, so that close tolerances are possible. Each spindle is inspected for quality.

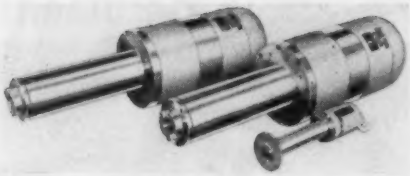


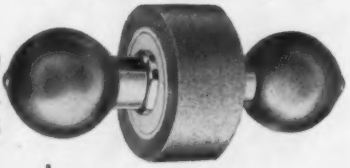
*Illustration showing Whitnon Spindles*

For more data circle **123** on Reader Service Card


**HANCHETT** **METCALF WHEEL DRESSERS**

***FAST CUTTING ACTION***

**Balanced . . . Free Running . . . High Speed Crushing and Wheel Forming Action . . . For SHARP, CLEAN, OPEN WHEEL FACES**





**MODEL 1943 CC ASSEMBLY**

**STEEL CUTTERS For Surface Grinders, etc.**

**Complete Extra Wheel Assembly $1.50 $7.95**

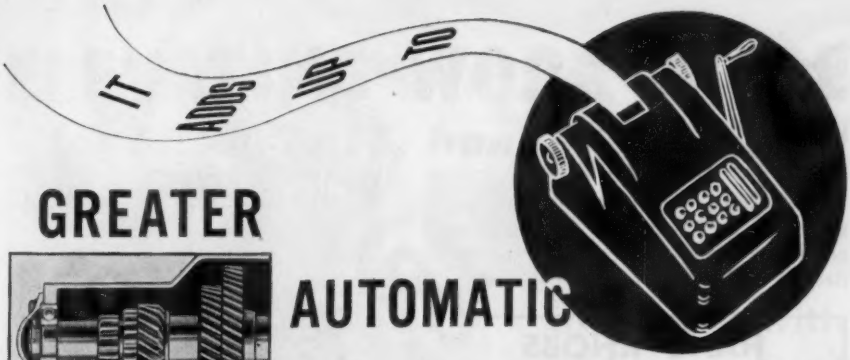
***Made by the World's Largest Manufacturers of***

**SAW SHARPENING and KNIFE GRINDING MACHINERY**

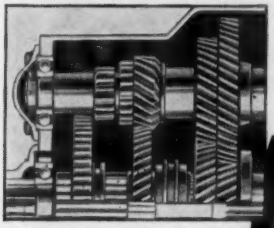
**HANCHETT MANUFACTURING CO.**

**BIG RAPIDS, MICH. MM-112 PORTLAND 1, ORE.**

For more data circle **465** on Reader Service Card

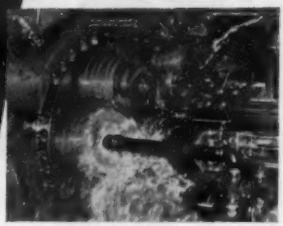



# GREATER AUTOMATIC PRODUCTION



Macco 472 at both ends positively eliminates the major complaint against using soluble coolants in automatics—the leakage of lubricating oil into coolant sump, and vice versa, causing rust in gear boxes.

## to use MACCO 472 at both ends of your AUTOMATICS



Macco 472 enables you to grind tools without the sharply defined chip breakers required with oils, due to the elimination of the hot or plastic chip. With the proper amount of coolant, the chip becomes brittle and breaks more easily, assuring longer tool wear. Cratering and breakage are minimized.

For years, leading manufacturers everywhere have been using Macco 472 emulsified oil as both a gear box lubricant and a cutting coolant. Almost without exception, they report sharply increased production and reduced costs.

You, too, will enjoy important benefits by using Macco 472 at both ends: Longer tool life—Increased spindle speeds and cutting feeds—Cooler operation—Inspection of parts without cleaning—Elimination of chip spinning and oil salvage—Up to 90% reduction in cleaning costs—Reduction of fire hazards and lower insurance premiums—General good housekeeping and a cleaner and more satisfied personnel.

*Only* a soluble cutting lubricant with the characteristics of Macco 472 should be so used. A minimum of 4000 lbs. per square inch of film strength at a 15 to 1 emulsion, with very little detergency, is required and the emulsion must be stable in every respect.

•

**For rust-proofing, investigate Macco Blucoat or Macco Anti-Rust**

•

***To work out this problem, write us or call a Macco Sales Engineer.***

**MACCO PRODUCTS COMPANY**

FOR THE METAL WORKING TRADE--SINCE 1931

CHEMICAL COMPOUNDS

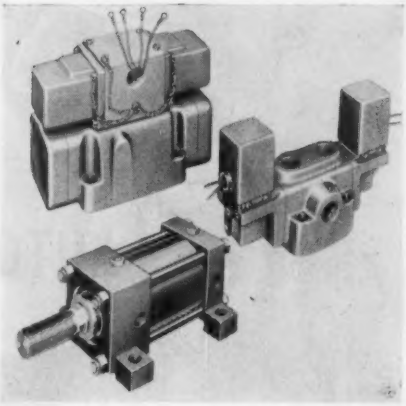
**9210 SOUTH SANGAMON STREET • CHICAGO 20, ILL.**

For more data circle **466** on Reader Service Card

*new shop equipment . . .*

## HYDRAULIC CONTROL VALVES AND CYLINDERS

Logansport Machine Co., Inc., 801 Center Ave., Logansport, Ind., has recently announced a new line of hydraulic control valves and cylinders.



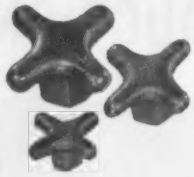
*Logan Valves, "9700" Upper Left; "9500-9600," Right; Hydraulic Cylinder, Lower Left*

The Series 9500-9600 valves have an operating pressure up to 1,500 p.s.i. and heavy-duty continuous service solenoids and many other outstanding features. The Series 9700 valves are built to accommodate pressures up to 3,000 p.s.i. and designed to meet J.I.C. hydraulic specifications.

The newly designed Logan hydraulic cylinders maintain pressures up to 2,000 p.s.i. Other features in this series of valves and cylinders include seven bore sizes from 1½ to 6 inches and a maximum stroke of 72 inches.

For more data circle **124** on Reader Service Card


**HAND KNOBS**



6 SIZES CAST-IRON
Tapped, Reamed or Blank
Hex-shaped hub for extra tightening
*Write for catalog*
TIETZMANN TOOL CORPORATION
DEPT. HK-1 • ENGLEWOOD, OHIO

For more data circle **467** on Reader Service Card

**Mold your own LEAD HAMMERS**

Here's the inexpensive, fast way of molding and remolding your own lead hammers with this COOK mold and ladle. It produces hammers that can "take it" Simple to operate.

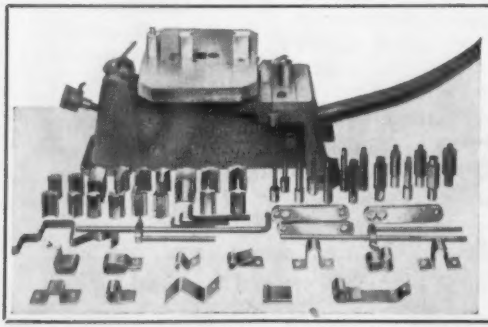


COMPLETE LEAD HAMMER SERVICE

*Write for circular and prices*

LAWRENCE H. COOK, INC.
67 MASSASOIT AVENUE, EAST PROVIDENCE 14, R. I.

For more data circle **468** on Reader Service Card



**Multiform**
BENDER CUTTER

Users report the Multiform Bender one of the handiest tools in the shop. No special tooling . . . Bends, Cuts, Punches, Flats, Rounds into Any Shape, Clamps, Brackets, Springs, Busbars, Wire Forms, Aircraft Work, Steel Rule Dies, Etc.

AIR OR HAND MODELS FOR UP TO ¼" to 4" MATERIAL
*Write for brochure which illustrates and describes the four bender models.*

J. A. RICHARDS CO.
Dept. 6-M Kalamazoo, Mich.

For more data circle **469** on Reader Service Card

# ELEVATING WORK TABLE

## *for FAST, SAFE, handling of dies*



**A strong, husky, die table with big overload safety factor**

**2000 lb. capacity**

**Only $245.00**

**f.o.b. Chicago**

**This "one man" die handler belongs in every machine shop**

### GREATER LIFTING RANGE

24" minimum to 42" maximum height. Wheels under base frame — you can get up tight against press or rack.

Four crank studs — two at each end of table for high and low speed adjustment.

Roller bearings in wheels and casters for easy moving.

Floor lock holds table securely when moving DIES on and off.

Dimensions 24" by 36". Use it for small, medium and large dies.

Available from your local supplier or write Don Suhr.

**ECONOMY ENGINEERING CO., 4507 W. Lake St., Chicago 24, Ill.**

*Eastern sales office, 342 Madison Ave., New York 17, N. Y.*

**Makers of Die Handling equipment Since 1901**

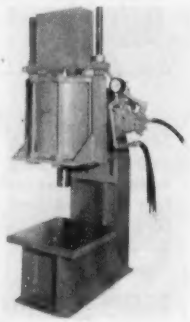
For more data circle **470** on Reader Service Card

## AIR ARBOR PRESSES DESIGNED FOR VARIED HEAVY-DUTY JOBS

Van Products Co., 5762 Old Ridge Rd., Erie 7, Pa., has announced 16 models of its heavy-duty Vi-Speed air arbor presses ranging from 1 to 5 tons, hand or foot controlled. They have up to 6¾ inches throat clearance with adjustable ram clearance up to 12 inches. The machine can also be used for riveting, forming, bending, press-fitting, and a wide variety of other operations. Units up to 2 tons are equipped with 1½ inch o.d. rams; larger units have 2 inch o.d. rams. Most of these rams are keyed to prevent rotation.

This line of presses has a unique cylinder arrangement. Base dimensions are kept at a minimum by stacking cylinders of similar bore sizes to increase the power thrust. On double-acting stacked cylinders, only one cylinder is used for the return stroke which permits 25 per cent savings in air consumption.

For more data circle **125** on Reader Service Card



*Van Air Arbor Press*


**HOW TO FIGURE PRESS FEEDING**

*Economy!*

UNIT COST DOWN, PROFITS UP! WITH DICKERMAN AUTOMATIC PUNCH PRESS FEEDS . . . AND HERE'S THE REASON WHY . . .

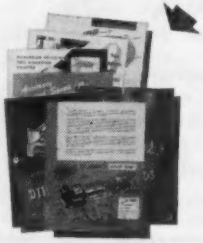
| Hand Feeding . . . | with Dickerman Feeds (83% press efficiency) |
|---|---|
| 8 hrs. @ 2000 pieces/hr. 16,000 | 8 hrs. @ 100 RPM x 60 48,000 |
| Labor @ $1.60 hr. $12.80 Cost per M pieces | Labor @ $1.60 hr. $12.80 Cost per M pieces |
| 80¢ | 22½¢ |



Dickerman Press Feeds don't get tired. Dickerman Press Feeds produce — and keep on producing — 24 hours a day if necessary without let-down, human error. Downtime is negligible—even on million plus runs.

Dickerman Press Feeds mean real savings, real gains. Dickerman Feeds cost little to install — pay for themselves in days — pay profits year after year AND as Dickerman Feeds will operate at any speed the tooling will withstand, unit cost drops as production increases. For automation . . . For new economy . . . install dependable Dickerman Feeds on all your press equipment now!

SEND today for catalogs on the complete money-making Dickerman line.



**Dickerman**

**H. E. DICKERMAN MFG. CO.**

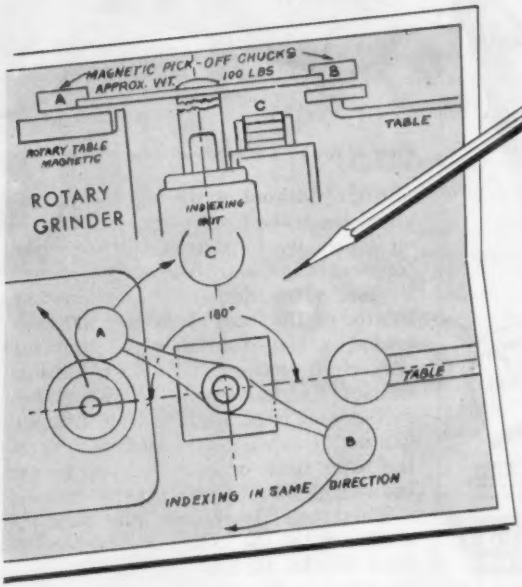
321-220 Albany St. • Springfield, Mass.

For more data circle **471** on Reader Service Card

*There may be a clue for you in this unusual application idea for*

# MAGNA-LOCK MAGNETIC CHUCKS...

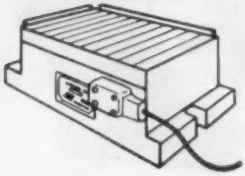





Drawing shows Magna-Lock magnetic chucks incorporated in indexing mechanism designed to automatically load and unload parts from rotary surface grinder. The Magna-Lock chucks hold the work pieces during the indexing cycle. The extra holding power of Magna-Lock electro-magnetic chucks has solved many difficult problems of feeding and transferring parts as well as holding work for grinding, milling, turning.

If you have a problem, Magna-Lock has the engineering skill and experience to help you solve it. Write today, Dept. MM-106





**Hanchett MAGNA-LOCK CORPORATION**

**BIG RAPIDS, MICHIGAN, U.S.A.**

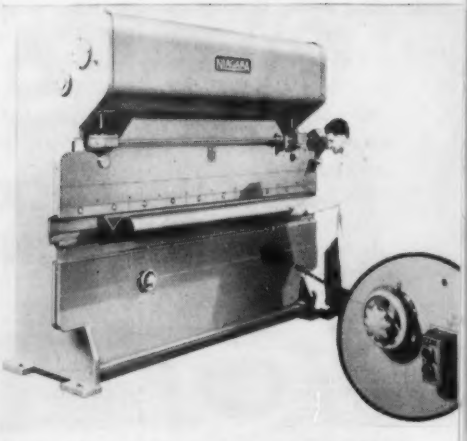
*designers and makers of a complete line of magnetic chucks and devices.*

For more data circle 472 on Reader Service Card

## FRONT-OPERATED POWER BACK GAGE

A new power driven, front operated, micrometer back gage is now available as optional equipment on Niagara press brakes of 50 through 150 ton capacities. This new gage enables accurate, quick settings, without requiring the operator to leave the front of the machine—an especially important feature when frequent gage settings are necessary. Vernier type indicators, conveniently located on the front of the bed, are calibrated in sixty-fourths of an inch for very close settings. Two push buttons control the movement of the power driven back gage. Both ends of the gage can be adjusted to the same setting at the same time, or each end can be set individually to handle tapered work.

This power back gage has been introduced by the Niagara Machine & Tool Works, Buffalo 11, New York.



*View of Niagara Micrometer Power Back Gage*

For more data circle **126** on Reader Service Card



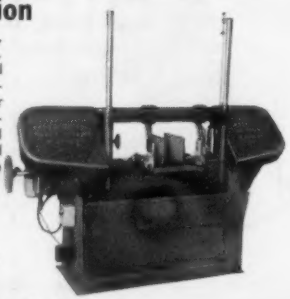


For more data circle **473** on Reader Service Card

## Variable Speed Drive—Full Hydraulic Operation

Speeds from 60 to 300 f.p.m. Combined with a graduated metering valve on our fully hydraulic models permits choice of proper blade speed and pressure for maximum production and blade life from high speed or high carbon steel blades.

MODELS W and F—9" x 18" and 14" x 18" capacity respectively, feature full hydraulic operation. All welded steel base—more rigid for heavier cutting. Welded one-piece cutting head for swifter blade changes and easier chip removal. Larger capacity coolant and chip tray. Automatic bar feed available to reduce operator's time to a minimum.



*Send for FREE CATALOG.* Dept. M.

**W. F. Wells and Sons**
*Metal Cutting Band Saws*
THREE RIVERS MICHIGAN

MODELS W & F

For more data circle **474** on Reader Service Card

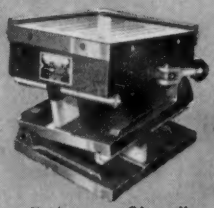
# 1ST

## *Your First Choice*

**FOR ANGULAR TOOLING . . . . ROBBINS!**

*Simplify*

**ANGULAR GRINDING**



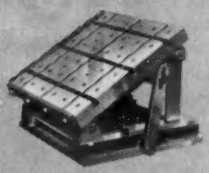
"Magna-Sine" Magnetic Sine Plates for precision set-ups grinding single or compound angles.

A look at the record shows exactly why Robbins equipment for angular tooling should be your first choice! Here's the record:

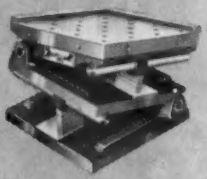
- 1ST to originate the idea of a simple sine plate for faster angular toolroom set-ups—*1936*
- 1ST to build these as a standard product for general distribution—*1936*
- 1ST to build a non-magnetic sine plate designed specifically for precision inspection —*1946*
- 1ST with a permanent magnet chuck—*1948*
- 1ST heavy duty sine plate for angular machining—*1954*
- 1ST *and the only one with* the exclusive "PERMA-FLAT" SWIVEL BLOCK—*1956*

*Simplify*

**ANGULAR MACHINING**



Heavy Duty Sine Plates for angular machining. Wide variety of sizes. 12" square model shown.



Inspection Sine Plates for precision inspection and light machining on single or compound angles.

Robbins is the only sine plate manufacturer with a complete line of sine plates for every angular set-up problem in precision machining, grinding and inspection. We also offer complete engineering and manufacturing facilities for the solution of special problems, and are now building high-production automatic assembly and other special machines. Send for sine plate literature, or send us details of your requirements in special machinery.

*Simplify*

**ANGULAR INSPECTION**

**OMER E. *Robbins* COMPANY**

**24800 PLYMOUTH ROAD** **DEPT. B** **DETROIT 39, MICH.**

***Also manufacturers of special machinery, automatic assembly machinery***

For more data circle **475** on Reader Service Card

## HITCH FEED STOCK REEL

A lightweight portable hitch feed stock reel has been announced by the H. E. Dickerman Mfg. Co., 321 Albany St., Springfield, Mass. The reel is capable of handling a wide range of small sized coils from 4 inches i.d. to 10 inches i.d. and will easily handle coils weighing up to 50 pounds. Coils may be ¼ to 2½ inches wide.

A time saving feature of the reel is self-centering of the coil. New reels may be loaded in minutes. The reel is equipped with frictionless needle bearings of ample size and a brake to control de-reeling speed. Post height is 36 inches with adjustable head which may be located anywhere on the post for most convenient feed. Three sizes of side supporting discs are available, 16, 20 and 24 inches. The diameter of the base is only 15½ inches to occupy minimum floor space and is readily portable from one press to another. Base and head are finished in machine grey, while the reel and post are gun blue.

For more data circle **127** on Reader Service Card



*Dickerman Hitch Feed Stock Reel*




**New**

**DRILL HEAD**
**AIR COUNTERBALANCE**
**SWIVEL ATTACHMENT**
FOR RADIAL
DRILLING MACHINES

This new combination Swivel and Air Counterbalance attachment makes it possible to adapt large multiple spindle drill and tapping heads to radial drilling machines. Flexible and easily adjusted, it insures maximum safety for the operator, as well as better operating economy.

Attachment includes air filter, pressure regulator, and an air oiler, and incorporates a 360° swivel feature fully aligning the drill head. It operates equally well with the fixed center type head and the adjustable type head.

This package is ideally suited for drilling condenser plates, boiler tube sheets, flue sheets, etc.

Manufacturers of all types of Fixed Center, Adjustable, and Individual Lead Screw Tapping Heads

US DRILL HEAD
THE UNITED STATES DRILL HEAD COMPANY
BURNS STREET • CINCINNATI 4, OHIO

For more data circle **476** on Reader Service Card

There Are Many
NEW APPLICATIONS
Never Before Associated With Finishing
FOR TODAY'S
RUBBER-CUSHIONED
ABRASIVES!

Replacing
Costlier,
Slower
Methods



## TIME SAVINGS FREQUENTLY 50%

**BURRING, CLEANING, FINISHING, POLISHING—*IN ONE OPERATION***



Investigate Brightboy's unique rubber-and-abrasive action, which you must see to believe! It has pioneered a completely new concept of finishing, widely broadening the scope of abrasive applications.

Readily available multi-use Brightboy stock grains and textures are job-matched to your work. In many instances they completely eliminate the expense and delay of ordering "specials".

Choose from the wide range of Brightboy abrasive grains in Silicon Carbide and Aluminum Oxide. Grains and textures range from extra fine to extra coarse—ALL in soft, firm and tough rubber binders.




*Ask your dealer for Brightboy recommendations and for the Brightboy Catalog listing grains, textures, machine speeds and work suggestions. Write us if he cannot supply you, or on any problem in which finishing is involved.*

WELDON ROBERTS
Brightboy
RUBBER CUSHIONED ABRASIVES

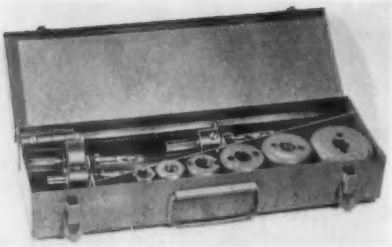
BRIGHTBOY INDUSTRIAL DIVISION • WELDON ROBERTS RUBBER CO. • 95 N. 13TH ST., NEWARK 7, N. J.

*America's Pioneer Manufacturer of Rubber-Bonded Abrasives*

For more data circle **477** on Reader Service Card

## ELECTRICIAN'S HOLE SAW KIT

A hole saw kit specially designed to meet electrician's needs has been marketed by The Henry G. Thompson & Son Co., New Haven, Conn. The kit consists of six Milford welded edge high speed steel hole saws ranging from ⅞ to 2½ inches in diameter and providing standard entrance sizes for pipe from ⅜ to 2 inches in diameter. There are also three arbors (including one of the follow-through type) and a 12 inch extension. The entire kit is contained in a compact, sturdy box of heavy gage metal; space is provided for several spare hole saws.



*H. G. Thompson Electrician's Hole Saw Kit*

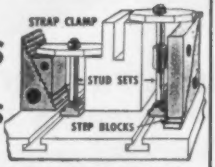
For more data circle **128** on Reader Service Card

★ ★ ★

## DUST COLLECTOR FOR HANDLING BULKY, STICKY DUST

A line of cyclone-type dust collectors featuring connections to standard 55-gal. drums has been introduced by Torit Manufacturing Co., Dept. 702, 296 Walnut St., St. Paul 2, Minn., for use in


**SURE GRIP STEP BLOCKS**
**STUD SETS**
**STRAP CLAMPS**




DEPT. SB-1
**TIETZMANN TOOL CORPORATION**
ENGLEWOOD • OHIO

For more data circle **478** on Reader Service Card

GET A BETTER **"SURFACE GRINDER"** JOB AT LESS COST!
QUICKEST AND EASIEST SETTING TOOLS ON THE MARKET

**RADIUS DRESSER $44.00** — **ANGLE DRESSER $49.00**



Diamond $7.00

*ORDER DIRECT on our 10 day money back guarantee*



Diamond $7.00

**Chatter Resistant, Spring Loaded Spindle**

Hardened shaft—bearing adjustable for wear. Diamond always perfectly centered. Easily set adjustable 180° stops.

10" Wheel size for DoALL and NORTON Grinders—$49.00. Diamond $7.00.

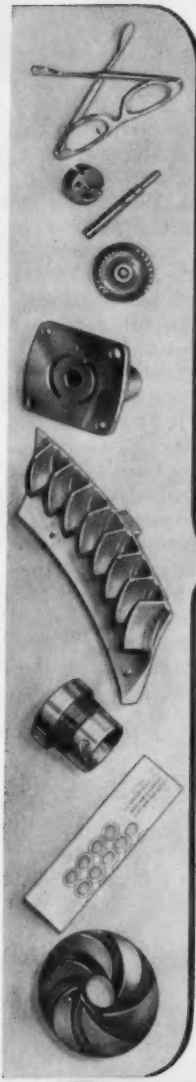
SPECIAL 20" Wheel Size $110.00.

**Ball Thrust Bearing.**
**24 Precision Ground Surfaces. Can be set very accurately with a Protractor or Sine Bar. Works underneath the wheel. Large bearing surfaces.**

**The "Mighty Midget" Line**

SPERMAN METAL SPECIALTIES • 2199 E. 21st ST. • BROOKLYN 29, N. Y.

For more data circle **479** on Reader Service Card



A few precision pieces produced on Gorton 2- and 3-dimensional Pantographs which saved time and money.



240 Pieces per hr.: serpentine groove cut in 1213 steel .1903" + .0014" × .109" + .003". Finish 35 mcr.

## GORTON

# Multiple Pantographing

### VOLUME PRODUCTION — PRECISION TOLERANCES

**Tool Room Accuracy and High Production are Gorton Characteristics!** From a dozen to a million pieces at exceptional repetitive accuracy. From two to six different operations performed at one setting. **Automatic Cycling** during engraving, milling, profiling, chamfering, counter-boring, grooving, routing, slotting, graduating, grinding, etching. **Production is dependent only on cutter capacity.** Spindle speeds from 900 to 45,000 R.P.M. Conventional or climb milling. Manual control for short runs. Automatic cycling for production runs.

**3 Services Available**

1. 16 Standard Models
2. Expertly-Designed Special Tooling
3. Custom-Built Special Machines



Newest Gorton 2-dimensional Pantograph, PI-2 Heavy-Duty model.

Write for Bulletins 1655, 2595-DS, 2604-DS 1710.




GORTON

SINCE 1893

GEORGE GORTON MACHINE CO.

1710 RACINE STREET • RACINE, WISCONSIN 56-4A

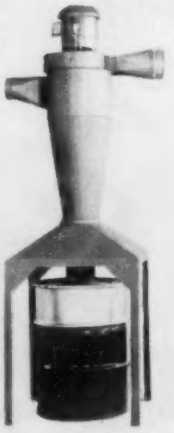
Tracer-Controlled Pantographs, Duplicators—standard and special . . . Horizontal and Vertical Mills, Swiss-Type Screw Machines, Tool Grinders, Small Tools and Accessories.

For more data circle **480** on Reader Service Card A 8846-1PA

tire recapping plants, woodworking shops and other installations where large volumes of bulky, sticky dust are constantly created.

Known as the Series 55 collectors, their exhausting capacities range from 1,000 to 1,100 c.f.m. at speeds in excess of a mile a minute. The collectors feed directly into standard 55-gal. (or smaller) drums, which can be quickly removed and replaced when full.

Originally developed as a special unit for the automobile tire industry, the collectors can be used wherever machinery creates great quantities of dust, buffing lint, chips or shavings that might tend to clog standard filters. Cyclone-type collectors use centrifugal force to precipitate all but the finest dust particles, up to 95 per cent, with the other 5 per cent being exhausted outside or trapped in an efficient after-filter bag. These collectors are easily installed, stand on a sturdy four-legged frame and have an airtight flexible shield that connects to the top of the drum. Everything is furnished except the drum.



*Torit Dust Collector*


Gillen

DOWEL PINS

Precision Ground

Stock

- Accurately Hardened
- Tolerances plus or minus .0001
- 2 Types-Boxed
- High Grade Steel
- Rust Resistant Coating

Standard Size BLUE LABEL for New Precision Work

Oversize Diameters RED LABEL for Re-Doweling Enlarged Holes

STOCKED MANY LENGTHS & DIAMETERS

WRITE FOR STOCK SIZE & PRICE LIST

John GILLEN Company

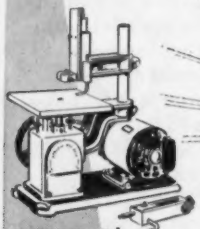
MAKERS OF EVERY TYPE OF KEYING AND PINNING DEVICE

2542 SOUTH 50TH AVENUE • CICERO 50, ILLINOIS • TOwnhall 3-5418

For more data circle 481 on Reader Service Card

*the NEW*

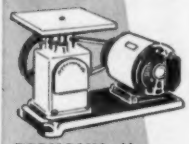
# KELLER Die Filers



DELUXE: Files, Saws, Laps. Has File Roller Support Arm and Overarm.



**Standard: With File Roller Support Arm for Maximum Accuracy**



ECONOMY: Has no File Roller Support Arm or Overarm.

- Self Compensating File Chuck
- Wide Capacity—1/8" diam. to 1/2" x 3/8" Files
- Throat Depth 7 1/4"
- Two Speeds—350/450 strokes per minute
- Full 1 1/2-inch Stroke

## *Saves Time, Saves Money, and Does the Job Better!*

**Built-for-the-Job** . . . Handles all shapes and sizes of files from 1/8" diam. to 1/2" x 3/8". File Roller Support has full 6-inch adjustment for Maximum Accuracy on every job.

**Large 8 1/2" x 8 1/2" Worktable** with plenty of room for clamping guide blocks, etc. Table tilts up-to 15-degrees in any direction and is locked by four knurled thumbscrews.

**Long, Dependable Service** . . . the Scotch Yoke is splash lubricated and equipped with Oilite Bearings throughout.

**Plenty of Power**—1/4 H.P. 1800 rpm motor.

***Write for Bulletin 256, and your distributor's name.***

**SALES SERVICE MACHINE TOOL CO.**
2355 University Ave. St. Paul 14, Minn.



ACCESSORIES: Steel Floor Stand, Hinged Belt Guard, and Gooseneck Lamp.

# KELLER

*Power* Die Filers

**Built by the makers of KELLER Power Hack Saws**

For more data circle **482** on Reader Service Card

Other specifications: height — 104 inches; width — 32 inches; depth — 32 inches; motor—2 h.p., 3,450 r.p.m.; inlet diameter—6 inches; outlet diameter —8 inches; static pressure—2.5 to 2.7 inches water; shipping weight — 440 pounds to 510 pounds.

For more data circle **129** on Reader Service Card

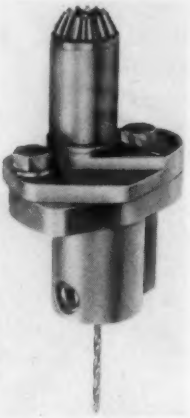
## TURRET DRILL ATTACHMENT

R and L Tools, 1825 Bristol St., Philadelphia 40, Pa., has just introduced a new Turret Drilling Attachment which can be adjusted to drill holes in the end of bars either on or off center within the capacity of the machine on which these attachments are used.

This new tool is available in three standard sizes: 5/8, 3/4 and 1 inch diameter shanks. The spindle assembly runs in a bronze shank and body in which there are two ball bearings.

The drive is transmitted to the spindle by a shaft through the turret which in turn receives its drive from a pair of bevel gears mounted in the center of the turret.

For more data circle **130** on Reader Service Card



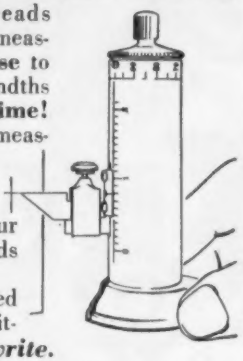
*View of R and L Turret Drill Attachment*





**with GREIST MICRO-HEIGHT® GAGE**

Precision-built Micro-Height reads **faster than your micrometer!** It measures height direct from **zero at base** to 3". Hundredths on barrel... thousandths on large head that **cuts reading time!** Attach your dial indicator for quick measuring between holes, surfaces!



**CUT LAYOUT TIME!**

Micro-Height also scribes like your vernier height gauge. Riser extends range to 9".

Precision-built, satin-chrome finished Micro-Height Gage quickly pays for itself! ***Call your distributor or write.***

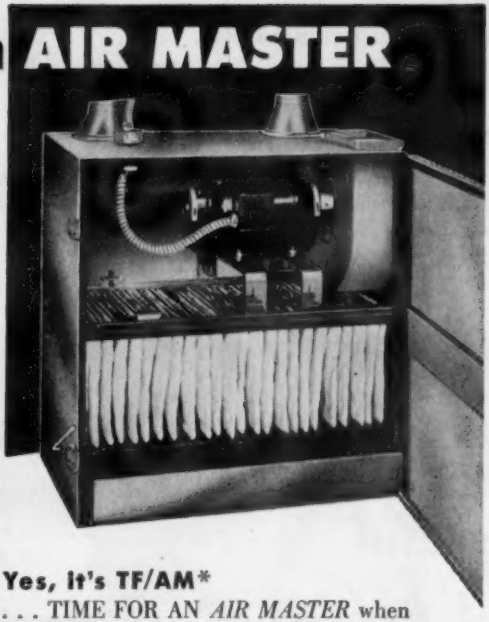
THE GREIST MANUFACTURING CO., 4910 BLAKE ST., NEW HAVEN 15, CONN.

*Precision Products since 1871.*

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# Time for an AIR MASTER



**Yes, It's TF/AM***

. . . TIME FOR AN *AIR MASTER* when "sandpaper-air" drips enough dust on benches and equipment to attract a doodler.

Air borne and collecting dust can reduce equipment to "dirt cheapness." It can injure the health of your employees. Dust can and does cost you money.

If you grind, buff and polish, you need *The Cincinnati Air Master* . . . for new equipment, and for that already in operation. Closely woven fabric and steel wool filters "wash" aggravating dust and grit laden air. Grinder or buffer switch starts or stops *Air Master* simultaneously. Compact, quiet operation; easy to clean.

*We also manufacture a complete line of Drills, Grinders and Buffers.*

*For details, write for catalog 56-BA.*

**The CINCINNATI ELECTRICAL TOOL CO.**

Division of The R. K. LeBlond Machine Tool Co.

2692 MADISON ROAD, CINCINNATI 8, OHIO

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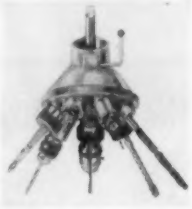
*new shop equipment . . .*

### AUTOMATIC INDEXING MULTI-SPINDLE DRILL HEAD

Jersey Mfg. Co., 401-C Livingston St., Elizabeth, N. J., has announced an automatic indexing turret-type multi-spindle drill head. The drill head can be used on single spindle drill presses and therefore affords greater productivity and economy. The head known as the Jemco ARBO-2, automatically revolves and indexes and takes two to seven tools at one time.

All spindles are completely and quickly interchangeable for maximum efficiency. Ten independent speeds are available. All work spindles are provided with suitable Morse and Jacobs tapers, and with suitable drilling and tapping chucks. Special tapers are available on request. According to information from the manufacturer, the outstanding features are cited as: workpieces completely machined with single chucking; changes speeds quickly; no reversing of drill spindle necessary during tapping operation; ⅛ to 9/16 tapping capacity, 0 to 19/32 drilling capacity.

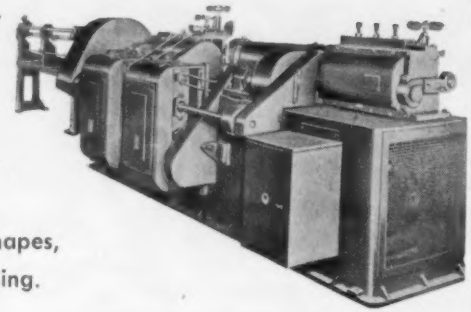
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*Jersey Drill Head*


**SHUSTER** *wire straightening and cutoff* **NEWS!**

**NOW! ELECTRICALLY CONTROLLED CLUTCH AND TARGET ON INFINITE SPEED SHUSTER 3 AV**



**SHUSTERS** are available for .025" to 11/16" wire; shapes, flat stock, tubing.

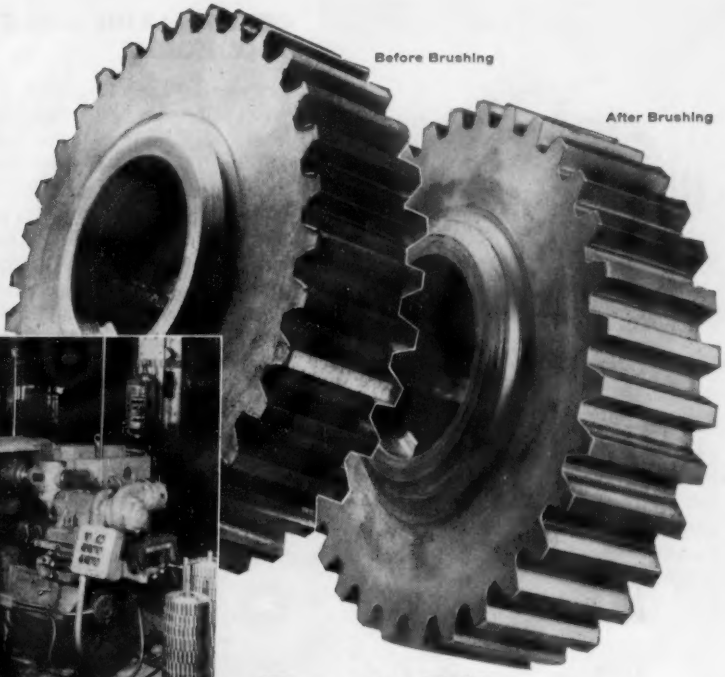
Variable speed of feed and cutoff is individually controlled. And now, with electrical control of clutch and target, the 3AV straightens and cuts wire (¼" to ½") with great accuracy and efficiency.

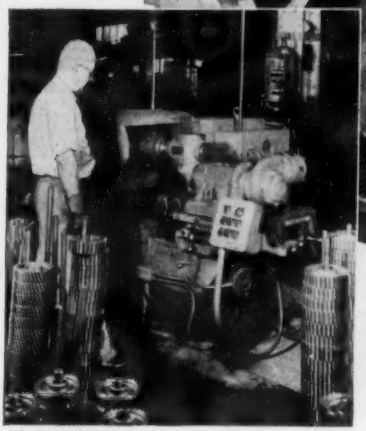
**METTLER**

**MACHINE TOOL, INC.**

**157 Adeline Street New Haven, Connecticut**

For more data circle **485** on Reader Service Card



*A leading machine company, supplying gears for mining and a variety of other heavy machinery, uses Osborn's Brushamatic 4 and a brushing cycle of 6 seconds a side to finish these gears in lots of 20 and up.*

# Pays Off...
# 25 for 1

REMOVING burrs from the teeth and internal spline of this gear was once a 5 minute, hand filing operation. Using Osborn Brushamatic® methods, only 12 seconds are required to remove these burrs. In addition, power brushing blends all surface junctures, reducing fracture-causing concentrations of stress.

An **O**sborn **B**rushing **A**nalysis, made in your plant and at no obligation, will show how *you* can improve quality while making similar savings in finishing time and cost. Write *The Osborn Manufacturing Company, Dept B-7, 5401 Hamilton Avenue, Cleveland 14, Ohio*

OSBORN

BRUSHING METHODS • POWER, PAINT AND MAINTENANCE BRUSHES
BRUSHING MACHINES • FOUNDRY MOLDING MACHINES

Osborn Brushes

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NO,NO...a thousand times "NO"

"NO loss of time,"
say the thousands of users
of LAMINUM SHIMS...

NO machining!

NO grinding!

NO counting!

NO stacking!

NO miking!

LAMINATED SHIMS OF

LAMINUM

SURFACE BOMBED... THEY peel FOR ADJUSTMENT

| | |
|---|---|
| STAINLESS STEEL with laminations of .002" or .003" | LOW CARBON STEEL with laminations of .002" or .003" |
| BRASS with laminations of .002" or .003" | ALUMINUM with laminations of .003" only |

LAMINATED SHIM COMPANY, INC.
Shim Headquarters since 1913
3310 Union Street, Glenbrook, Conn.

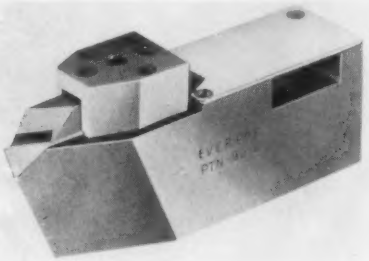
For more data circle 487 on Reader Service Card

## COPYING LATHE CARBIDE TOOL HOLDER

Everede Tool Co., 2000 N. Parkside Ave., Chicago, Ill., has developed a + GF + copying lathe carbide tool holder. The firm reports its holder reduces tool costs as much as 66 per cent while performing on all types of steels with greatly diversified finishings and cutting problems. The holder can machine alloys including stainless, 52-100 and K-Monel at over 600 f.p.m. maintaining size and finish. It can machine mild steel at ½ inch depth of cut at 400 s.p.m. at 0.020 feed. The holder also has demonstrated that it can plunge machine ½ inch deep at 30 degrees and on the same part face out on a flange all in one operation.

The manufacturer states that the holder has four distinct advantages: neutral or positive rake permitting faster metal removal with the same or less h.p.; infinitely adjustable, on-the-job carbide faced chip breaker assuring positive action at any speed or feed; solid carbide triangular tool bits 3½ inches long available in all grades and any nose radius or any lead angle from positive to negative for requirements as to part, finish or machinability. This eliminates the necessity of designing special parts to fit tooling and thereby avoids additional cost and time.

Fo more data circle 132 on Reader Service Card



*Everede Copying Lathe Carbide Tool Holder*

# *Now....* AVAILABLE FROM STOCK

# *Jarvis* PIPE TAPS

## WITH STANDARD HAND TAP SHANKS!




Here's the answer to the problems presented by conventional pipe taps! Exclusive Jarvis Pipe Taps with standard hand tap shanks easily fit any tapping machine or device—with never a chucking bottleneck. This addition to the dependable Jarvis line of standard taps affords new tapping versatility and precision.

Here's the big advantage of Jarvis taps with Standard Hand Tap Shanks—

| | ¼"—18 NPT Standard Pipe Tap | ¼"—18 NPT New Jarvis Pipe Tap |
|---|---|---|
| Shank dia. | .5625 | .480 |
| Square size | .421 | .360 |
| Overall lgth. | 2⅞" | 3⅛" |

Three other sizes are stocked—⅛", ⅜", ½"—and all save man-hours, production dollars. A Jarvis representative is as near as your phone.

*Send Today for Catalog!*

Complete manual with tap data and tips for better tapping is yours for the asking!




**Jarvis**
CORPORATION
POWER TOOLS FOR INDUSTRY
MIDDLETOWN, CONNECTICUT

For more data circle 488 on Reader Service Card

## BORING CHUCK SET

A boring chuck set, which will bore any size hole from 5/32 inch to 5 inches, has been introduced by Moore Special Tool Co., Inc., 730 Union Ave., Bridgeport 7, Conn., for use with the company's jig borers now in operation. A ½ to ⅜ inch reducer bushing makes it possible to use either ½ or ⅜ inch shank tool bits. The bits are available in either high speed steel or carbide. The boring chuck is hardened and ground, including the adjusting lead screws and is completely dust-protected. A large, clear dial with 50 graduations increases the hole 0.001 inch in diameter per graduation.

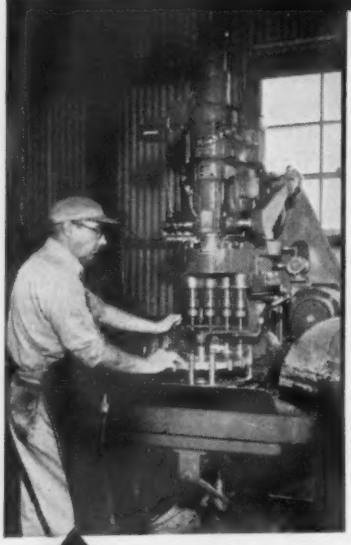
In actual operation the chuck will start behind center for small holes and move ⅜ inch plus. The slide can be unclamped, moved and reclamped in exacting increments. One just recently made wrench fits all screws. Appropriate shank adapters, also available, permit use of this boring chuck set with all machines with No. 40 tapers and with all Bridgeport milling machines.

For more data circle **133** on Reader Service Card



*Moore Chuck Set*

*Thompson Products Inc.* | *West Coast Division*



**tapping production DOUBLED in pieces per hour with longer tool life**

KAUFMAN

There's a good reason for that kind of a record. *Kaufman specializes in building tapping machines* . . . highly-precisioned machines designed for high production runs or for the versatile, multiple machine shop requirements. For complete information on how you can reduce production costs in your plant . . . send prints and samples of your work to

**KAUFMAN MFG. CO.**

**551 S. 29th St. Manitowoc, Wisconsin**

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TRADE MARK
"FULFLO"
REG. U. S. PAT. OFF.

# OIL-RELIEF BY-PASS VALVES

## PRE-DETERMINES OIL PRESSURE ON TORQUE CONVERTERS

Constant, uniform oil pressure is an important factor in satisfactory performance on thousands of hydraulic applications . . . just as on these torque converters.



You may not make torque converters or use them . . . but you probably NEED FULFLO VALVES in your particular equipment. The FULFLO ENGINEERS can help you on your hydraulic problems. It's yours for the asking.

Note the installation on the torque converters used by Twin Disc Clutch Co., Rockford, Ill.

6 springs for pre-determined pressure from 0# to 500#; pipe sizes from ¼" to 2"; standard or flange models.

Send for
NEW MECHANICAL DATA BOOK.
Colorfully illustrated.

TRADE MARK "FULFLO" REG. U. S. PAT. OFF.

THE FULFLO SPECIALTIES CO. Inc.
PUMP AND VALVE MANUFACTURERS
BLANCHESTER, OHIO

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*new shop equipment . . .*

## 15-INCH DRILL PRESS

Rockwell Manufacturing Co., Delta Power Tool Division, 456 N. Lexington Ave., Pittsburgh 8, Pa., has announced its Delta 15-inch drill press. The press is available in a wide range of models and is designed to provide the ruggedness of much heavier presses. The press is versatile and offers six different spindle adapters. The press is suitable for production as well as small commercial shops.

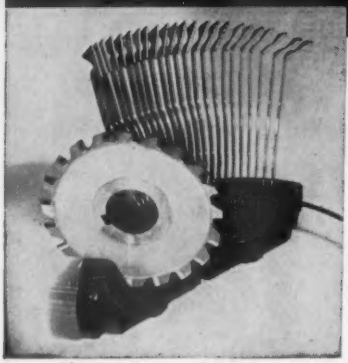
Extra ruggedness is provided by four over-sized, pre-loaded, lubricated-for-life ball bearings incorporated in the spindle construction. A heavy-weight head, cast in a single piece, and a large, two-inch diameter quill provide rigidity and longer life. A multiple-spline "floating drive" means less vibration, smoother operation and more power at the spindle.

The machine's six separate spindle adapters feature taper mounting for accuracy and are firmly locked on the spindle with a threaded collar. With these adapters the machine can perform dozens of specialized tasks in addition to drilling holes (½-inch diameter



*Delta Drill Press*


If You Can See It — You Can
SAW IT with a GAY-LEE
"THINSAW"



*Slotting typewriter type bar segment.*

Solve problems in high-precision slitting, slotting, sawing with Gay-Lee carbide-tipped Thinsaw! Wafer-thin for the most delicate work with positive alignment and rigidity that avoid run-out . . . but retaining the speed and long life of carbide. Patented construction holds tips firmly.

Patented — manufactured under license
Stronger Brace
Circular Seat

- THIN AS .030"
- DIAMETERS UP TO 12"

Complete Line of Saws for Any Application—To Any Tolerance

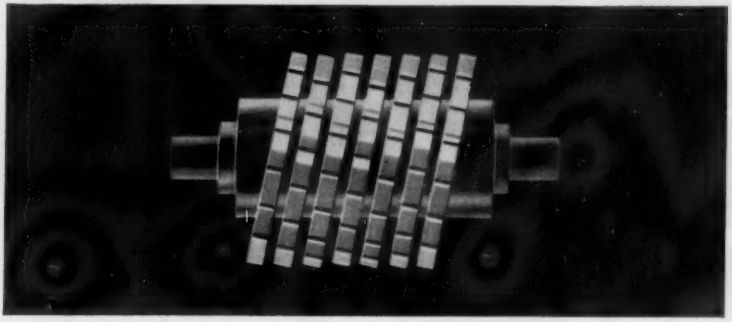
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GAY-LEE COMPANY
CLAWSON • MICHIGAN

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# ANGLE

## for heavy-duty dressing





Desmond's Heavy Duty Dresser makes quick work of truing large, high speed rubber- or resinoid-bonded grinding wheels. Shears and picks at same time with patented angle-set Desmond-Huntington cutters. Dust-shielded ball bearings guarantee lasting precision. Cutters easily replaceable without adjusting bearings. Ask your Desmond distributor how proper dressing can make your grinding wheels serve better—longer.

THE ONLY COMPLETE LINE OF GRINDING WHEEL DRESSERS AND CUTTERS

**Desmond**

THE DESMOND-STEPHAN MFG. CO., URBANA, OHIO

For more data circle **492** on Reader Service Card

production operations). Operations with adapters include counterboring, tapping, surface grinding, routing, mortising, plug cutting and wood shaping.

Slow and high speed models offer a range of 470 to 4,600 r.p.m. An improved multi-speed attachment permits even wider ranges for such special operations as reaming at slow speeds and small hole drilling at high speeds. The drill press is powered by a 1/3 or ½ h.p. motor. Spindle travel is 4-5/16 inches. Either a ½-inch key chuck or a No. 2 Morse taper spindle may be selected for any model.

For more data circle **134** on Reader Service Card

★ ★ ★

## OUTSIDE MICROMETER

A hole locating and tubing micrometer has been introduced by The Lufkin Rule Co., Saginaw, Mich. This micrometer has an extra small diameter (0.089 inch) anvil, small enough to enter a 3/32 inch i.d. hole or slot. The anvil is held with a set screw and can be easily and quickly replaced in case of either wear or breakage.

The Lufkin Outside Locating Micrometer features a non-glaring

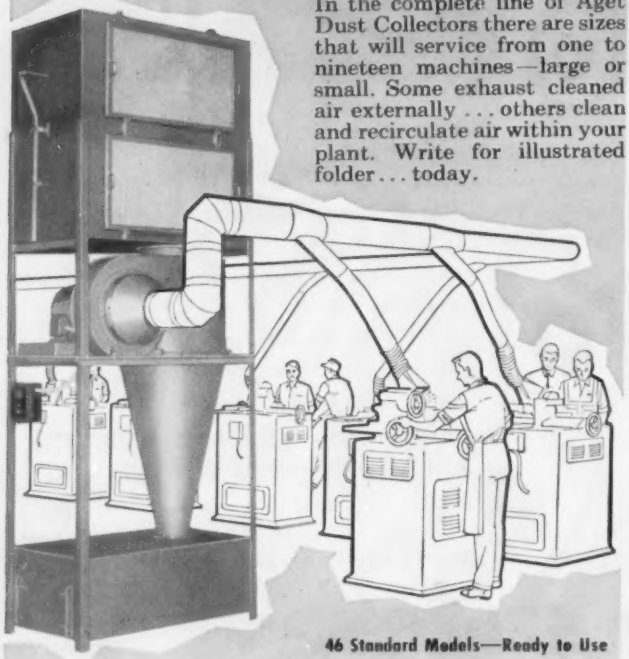


*View of Lufkin Outside Locating Micrometer*

just ONE DUSTKOP STOPS DUST

heavy duty unit services up to 19 MACHINES

In the complete line of Aget Dust Collectors there are sizes that will service from one to nineteen machines—large or small. Some exhaust cleaned air externally . . . others clean and recirculate air within your plant. Write for illustrated folder . . . today.



46 Standard Models—Ready to Use

AGET manufacturing company
1398 Church Street • Adrian, Michigan

For more data circle **493** on Reader Service Card

# AMES




## Check Motions or Dimensions In .001" up to 10" Range.

With Ames Long Range Dial Indicator models you can measure in .001", long slide travel, large cams, deep recesses or other dimensions requiring indicator spindle travel of up to 10". Also they have all the advantages built into Ames regular indicators:—large diameter dials, widely spaced dial graduations; movable dials; replaceable contacts, count hands to indicate revolutions of the indicator hand.

Send your problem in long range measuring, Ames will be glad to suggest a solution.



*Representatives in principal cities*



## B.C. AMES CO.

*29 Ames Street, Waltham 54, Mass.*

MANUFACTURER OF MICROMETER DIAL GAUGES • MICROMETER DIAL INDICATORS

For more data circle **494** on Reader Service Card

chrome clad finish on the thimble and hub and has a black enameled, heavy-duty ribbed, half frame. The micrometer has a range of 0 to 1 inch by 1000ths, and is furnished with either a plain thimble or with a ratchet cap depending on the user's preferance.

For more data circle **135** on Reader Service Card

## LEAKPROOF PALM BUTTON VALVE

A leakproof palm button valve has been announced by Ross Operating Valve Co., 120 E. Goldengate Ave., Detroit 3, Mich., and is suitable for all general applications which require a normally closed straightway or three-way hand operated pilot valve. It is designed specifically for use in circuits where safety is of prime importance.

This valve can be provided with a tumbler type lock, enabling the valve to be locked by authorized personnel in either the open or closed position. Due to its low operating force and large diameter palm button, the 122-Series valve will reduce operator fatigue. Although it is ¼ n.p.t. side ported, its overall height is only 2⅜ inches. The 3-way model has a non-piped exhaust and both the straightway and 3-way model have ¼ inch diameter flow capacity.

For more data circle **136** on Reader Service Card

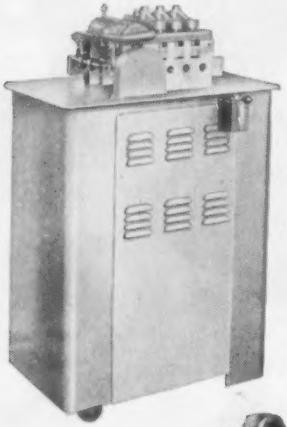


*Ross Palm-Button Valve*

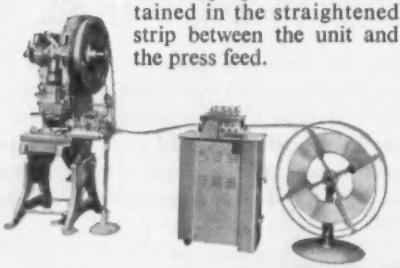

**Economy • Dependability**

**WITTEK**

**STOCK STRAIGHTENERS**



Used in conjunction with a reel stand and automatic feed for punch presses, the Wittek Stock Straightener is a self-contained, motor-driven unit designed for maximum efficiency in the continuous straightening of coiled stock. Standard models handle stock with widths up to 12 inches. An infinitely variable speed drive permits any desired straightening speed so that the proper slack is maintained in the straightened strip between the unit and the press feed.



This typical Wittek automatic production feeding setup includes —Wittek roll feed mounted on the punch press, Wittek stock straightener, and Wittek self-centering reel stand.

5577

**Write for full particulars**

**WITTEK** Manufacturing Co.

432 W. 24th Place • Chicago 23, Illinois

Production Feeding Equipment

For more data circle **495** on Reader Service Card

*to economize*

# STANDARDIZE *with* RING



## precision PUNCHES and DIES



Ring Standardized Punches and Dies offer cost saving dependable performance for all of your perforating problems.

Precision volume production to rigid specifications offers

- ★ Low cost
- ★ Complete interchangeability
- ★ Immediate shipments from stock on Standards plus prompt delivery on Specials
- ★ High quality — long life



MANY SHAPES AND TYPES




Blanks — Pilots — Headless — Shoulder and Bevel Head Quills — Slug Ejector Punches — Transfer Punches

***NEW!*** Tough — Accurate Retainers for Ring Punches and Dies mount easily to your die set. Available in Key Type for irregular shapes.

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## RING PUNCH & DIE COMPANY

19 FENTON PLACE - - - - - - - JAMESTOWN, N. Y.

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*new shop equipment . . .*

## CUT-OFF MACHINE EQUIPPED FOR AUTOMATIC PRODUCTION

Stone Machinery Co., 131 Fayette St., Manlius, N. Y., has announced its M-75 cut-off machine. The machine is specifically designed for cutting ferrous metals and is equipped with fully automatic bar stock feed and power stroked head for completely automatic production line work. Speeds of 550 cuts per hour are maintained during production runs, with tolerances held to less than 0.005 inch. Work is turned out with a milled-like finish, eliminating need for further machining.

The machine has a wheel wear compensator which adjusts for fast approach and regulated speed of cutting operation by hydro check. This assures accuracy throughout the life of the wheel. The cutting head is engineered with geared-in-head positive drive that delivers all the power to the cutting wheel. It is built to handle the toughest cutting jobs on the production line.

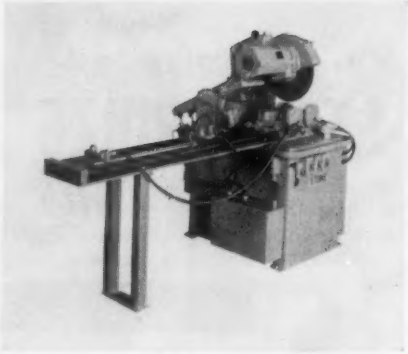
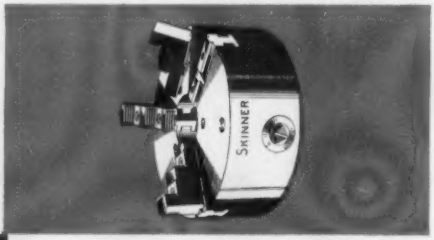


*Illustration showing Stone Cut-Off Machine*

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★ ★ ★ ★ ★


*for long-lasting accuracy and safety!*




**SKINNER**

precision self-centering

SCROLL CHUCKS

Available in sizes from 3″ to 18″ for light, medium and heavy-duty toolroom jobs and production runs. Each is furnished with two sets of solid jaws, or 2-piece jaws for holding internal or external work. Bodies are forged or semi-steel; other parts are heat-treated alloy steel. Lands on the jaw, jaw steps and end bites are ground after the chuck is assembled.

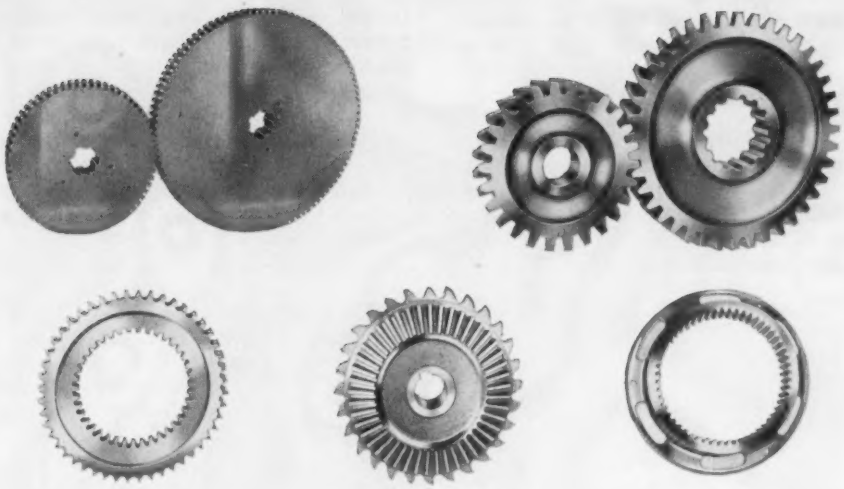
THE CREST OF QUALITY

*Write Skinner or your Skinner distributor for folder.*

THE SKINNER CHUCK COMPANY

210 Edgewood Ave., New Britain, Conn.

For more data circle **497** on Reader Service Card



## *Specialists in the production of* GEARS.

Whatever your requirements, you will find that it pays to have your gears made to order by specialists. Here at Adams we have the skilled personnel, the precision equipment and the specialized experience that is necessary to produce high quality gears made exactly to your specifications.

**The next time you need gears, be sure to get in touch with The Adams Company, 1942 Cypress St., Dubuque, Iowa.**

The Adams line . . . Spur Gears . Helical Gears . Bevel and Miter Gears . Worms and Worm Gears . Sprockets . Internal Gears (spur and helical) . Ratchets . Splined Shafts . Lead and Feed Screws . Shaved Tooth Gears (spur and helical) . Ground Thread Worms . Racks

**The ADAMS Compa**

**Dubuque, Iowa, U. S. A.**

ESTABLISHED 1883

GEARS

FINE GEARS MADE TO YOUR SPECIFICATIONS

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*new shop equipment . . .*

## WELDED EDGE HOLE SAWS

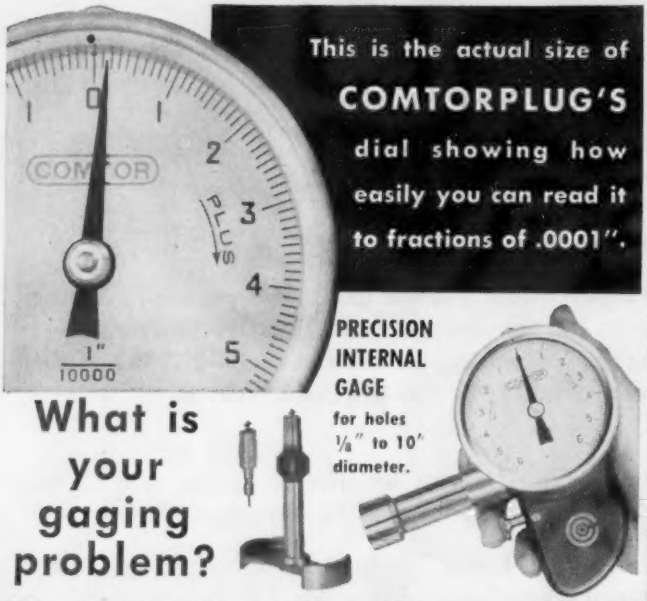
L. S. Starrett Co., Athol, Mass., has announced its shatterproof, heavy-duty "Safe-Flex" hole saws. They have been designed to cut clean, round holes from 9/16 through 6 inches in diameter in any machinable material up to 1⅛ inches thick including steel, brass, bronze, cast iron, aluminum, wood, plastics, sheet steel, cast iron, steel pipe as well as other materials. These welded edge hole saws are particularly recommended for use with portable power tools with ½ inch or larger chucks and on machine tools such as lathes, drill presses and radial drilling machines.

Double welding combines a high speed steel cutting edge with an extra-tough, shatterproof body which is welded to a rigid steel cap threaded to accommodates interchangeable arbors. Arbors are available with ½ or ¾ inch hexagon shanks and also with a ¼ inch round shank. A ¼ inch high speed steel pilot drill is incorporated into each arbor according to information received from the manufacturer.

For more data circle 138 on Reader Service Card

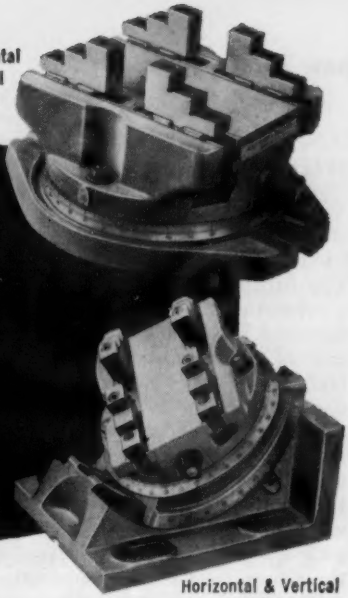


*Starrett Hole Saw*


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Horizontal Swivel Type



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## ELECTRICAL HIGH SPEED STEEL HARDENING FURNACE

The Sentry Co., Foxboro, Mass., has announced its Model Y redesigned electric high speed steel hardening furnace. The furnaces are designed to provide a correct application of the company's diamond block method of atmospheric control, which produces fine quality high speed steel hardening at a low cost. According to the manufacturer, many design features make this equipment an ideal addition to the well established toolroom or production heat treating operation as well as for the smaller shop just beginning or investigating the possibility of performing their own heat treating operations.

The atmospheric control system incorporated in the furnace produces quality hardening, free from scale or decarburization, on all types of tungsten, cobalt and molybdenum high speed steels and high carbon high

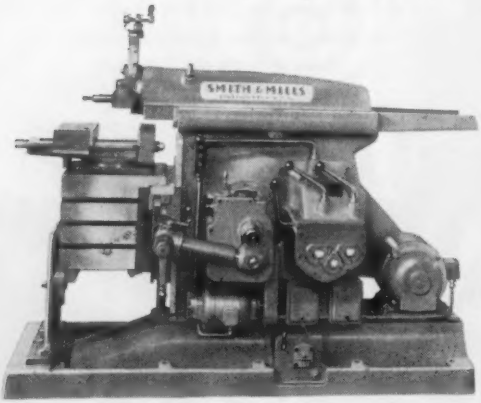


*Sentry Model Y Steel Hardening Furnace*

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Smith AND Mills SHAPERS CINCINNATI

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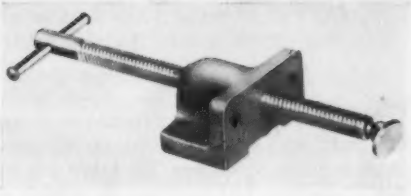
chrome die steels. This automatically constant atmosphere requires no adjustments and, therefore, consistent hardening results are obtainable from day to day by the trained metallurgist or the inexperienced operator.

For more data circle **139** on Reader Service Card

★ ★ ★

## FIXTURE LOCK HAS MANY TIME-SAVING USES

Wilton Tool Mfg. Co., Inc., Schiller Park, Ill., has announced its Rapid Titan Fixture Lock, an inexpensive jig and fixture device that features automatic clamping, automatic release, and positive screw tightening. The free sliding action of the screw makes it possible to save time, and maneuver workpiece more easily. The continuous tightening feature enables the operator to secure work safely in machines, on benches, or in special fixtures. The front and



*View of Wilton Rapid Titan Fixture Lock*

bottom of the body are machined flat, to an accurate 90 degree angle, and mounting holes are provided in both faces. The screw is cadmium plated, and has a travel of 6¼ inches.

For more data circle **140** on Reader Service Card

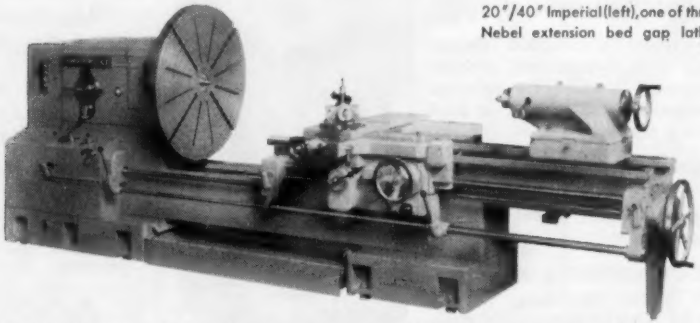
★ ★ ★

## PRECISION CROSS-SLIDE TABLE

Lawrence H. Cook, Inc., 67 Massasoit Ave., East Providence 14, R. I., has introduced a precision cross-slide table.

★ ★ ★ ★ ★


20″/40″ Imperial (left), one of three Nebel extension bed gap lathes

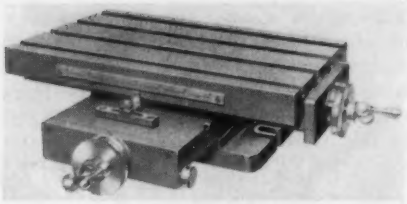


**Nebel *double duty* extension bed gap lathes**

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Nebel LATHES CINCINNATI

For more data circle **502** on Reader Service Card



*View showing L. H. Cook Cross-Slide Table*

It fits all rotary tables 12 inches or more for radii and angle milling on all vertical milling machines. Its table top is 8 x 12 inches; has four tee slots with 6 inch scales on each slide. The dials are graduated from 0.001 to 0.050 per revolution, has hardened and ground threads on lead screws with 2½-inch bronze nuts.

This table is 15 inches long and only 4 inches high, and is light in weight, (65 lbs.) and made of high grade cast iron. The ways and top are all hand scraped to a minimum precision tolerance and are especially adaptable for all work on mold cavities and plungers, dies and templates.

For more data circle **141** on Reader Service Card

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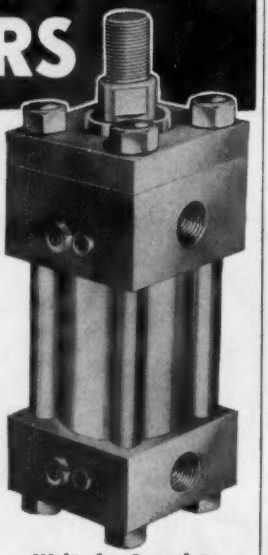
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*View of Ace Longboy 18 and 12 inch Drills*

standard stock 18-inch Longboy drills recently developed by Ace Drill Corp., Adrian, Mich. The drills are available in fractional sizes ranging from 3/16 to ¾ inch. They are made from uniformly hardened high speed steel to provide straightness and symmetrical, highly polished flutes. The web is concentric with the diameter and the cutting lips possess an identical finish. The manufacturer states that these factors result in an equally distributed cutting load, smooth chip flow and a reduced resharpening frequency. 12 inch Longboys are also available from the firm.

In addition to the 18-inch Longboys, the Ace line also includes 12 inch Longboys, thus providing an extensive selection.

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## TEMPERATURE CABINETS FOR HEAT AND COLD REQUIREMENTS

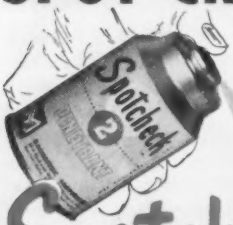
Trop-Arctic Temperature Products, 627 S. Mulberry St., Muncie, Ind., has announced its Model TAS-2-120A temperature cabinet. The cabinets can be used for a wide variety of purposes including low temperature refrigeration, high temperature applications, liquid baths, steel stabilization, metal hardening, shrink fitting and experimental





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*Illustration showing Trop-Arctic Model TAS-2-120A Temperature Cabinet in use*

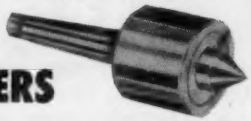
and production testing. The temperatures range from minus 200 degrees F. to plus 300 degrees F. Interior dimensions of the cabinet are as follows: interior, 16 by 18 by 12 inches; overall, 42 by 37 by 44 inches to the top of work space. It is constructed of heavy gauge cold rolled steel and finished in gray hammertone enamel.

According to the manufacturer, low temperature equipment has a decided advantage over conventional assembly methods including pressing and expansion heating of female member. The male part is cold treated or shrunk, then inserted into the female part and allowed to expand into place assuring a perfect mating of assembled parts. Cold treated parts are easier to handle, do not oxidize and eliminate the possibility of marring or changing the part dimensionally and it is, therefore, unnecessary to do any corrective machining following assembly.

The compressors are semi-hermetically sealed, and it is said that the

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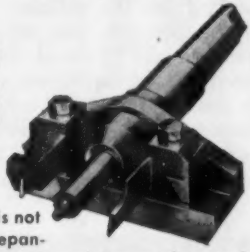
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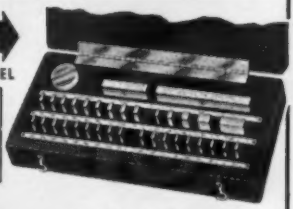
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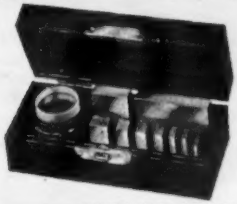
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refrigeration section can be located remotely from the cabinet. The cabinet operates on 220 volt, 60 cycle, single phase power. Thermal capacity is designed so that rapid heat removal from the mass load in the cold chamber is effected. Rapid pull-down is through cascade system. Multiple low temperature gasketing assures minimum thermal gain. The use of double bakelite keeps heat transmission to a minimum. Indicating-controlling instruments are standard equipment.

Optional equipment for the Model TAS-2-120A includes positive air circulation, electrical terminal panels, multipaned viewing window, recording instrumentation, chamber light, stainless steel exterior, apertures for electrical or hydraulic lines to inner chamber and casters. Others are available in sizes to meet all requirements.

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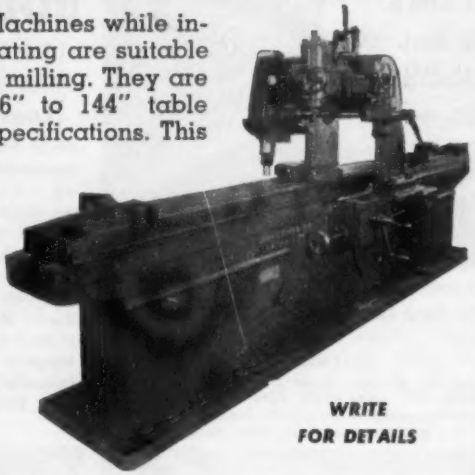
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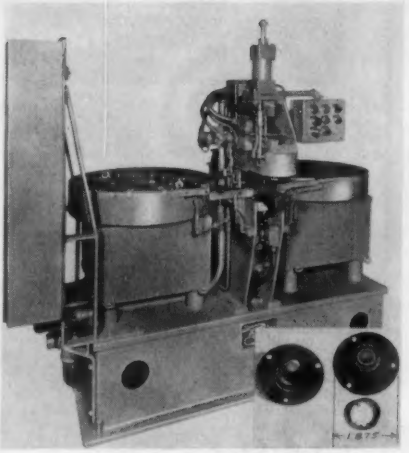
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Each housing is positioned with the open side up. A spring feeds over it,



*View of Robbins Automatic Assembly Machine*

where the spring is compressed and pressed into place by sliding V members. The assembly is then shuttled


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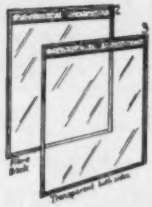
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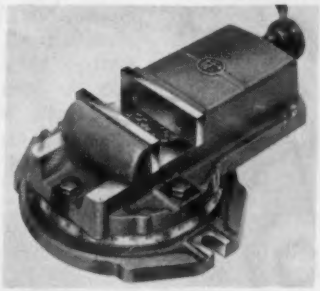
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Pressing in and orienting of the spring are done simultaneously, and the same slide that pushes the assembly under the orienting device automatically unloads finished assemblies. Production is controlled by an electronic timer, and the rate is 1,440 assemblies per hour at 90 per cent efficiency.

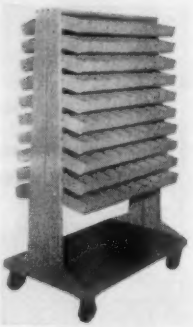
In addition to completely automatic operation, the machine features automatic lubrication, hardened and ground ways and all electrical and pneumatic equipment in conformance with J.I.C. standards. It is compact — 82 inches wide by 38 inches deep by 70 inches high and weighs approximately 5,000 pounds.

For more data circle 145 on Reader Service Card

★ ★ ★

## SMALL PARTS BINS

Portable floor bin units, utilizing five sizes of removable bin boxes, has been announced by Bathey Mfg. Co., 100 S. Mill St., Plymouth, Mich. The addition of a wheeled dol-



*Bathey Small Parts Bin*





Model 412-5PD Heavy Duty Straightener Straightens steel up to .125" thick and up to 12" wide.

A Littell straightener removes the curvature from coil stock. The press, slitter or shear receives a continuous strip of pre-straightened stock. Equipped with variable speed transmissions, Littell Straighteners are adjustable to meet a wide range of speed requirements in automatic feeding. They also simplify hand feeding. A variety of medium and heavy duty models straighten coil stock of all standard widths and thickness.

*Write for the Littell Straightener Catalog*

F. J. LITTELL MACHINE CO.

Speed with Safety

ROLL FEEDS • DIAL FEEDS • REELS
STRAIGHTENING MACHINES • AIR BLAST VALVES

*District Offices: Detroit, Cleveland*

4163 N. RAVENSWOOD AVE., CHICAGO 13, ILL.

For more data circle 517 on Reader Service Card

# SOSSNER ANNOUNCES

"the mark of quality since 1910"

SOME *NEW* TAPS

**WE ARE PROUD TO PRESENT THE LATEST ADDITIONS TO OUR COMPLETE LINE OF GROUND THREAD TAPS...**




## SPIRAL TAPS
### THE MOST COMPLETE LINE...

*REGULAR STYLE—#4 thru 5/16".* This is the general purpose spiral fluted tap, primarily for use in blind holes in non-ferrous materials. It cuts reliably close to size.

*HOOK STYLE—#4 thru 5/16".* The increased hook at the cutting face and a narrower land make this style more free cutting. Desirable for bar-stock aluminum and diecast alloys.

*THREE FLUTE STYLE—1/4" and 5/16".* This is a stronger construction than the two flute style and is recommended primarily for steel.

*DOUBLE SCOOP STYLE—1/4" and 5/16".* This unique construction combines a narrow land, hooked cutting face, maximum flute area and chip-breaker effect. Specially developed for deep blind holes.




## "elektra LUBE"
### A PERMANENT SUPER-LUBRICANT

The elektra LUBE process imparts a thin ductile deposit which acts as a permanent super-lubricant which imbeds itself into the microscopic pores of the ground tap, resulting in a smooth burnished surface which becomes an *integral* part of the tap.

High pressures at A and B force out conventional lubricant. elektra LUBE takes over at these critical points and provides *permanent* super-lubrication.



**SOSSNER TAP & TOOL CORPORATION**
29 BROADWAY, LYNBROOK, L.I., N.Y.

***Inquiries from representatives and distributors are invited.***

For more data circle 518 on Reader Service Card

ly under Bathey standard bin units, offers time saving features on operations where it is advantageous to move the parts to the job. Such operations include service, maintenance, repair and certain assembly operations. The unit shown is 24 inches wide by 36 inches long by 62 inches high. Bin boxes are 6 inches front to back, 2¾ inches deep and range in width from 1¾ to 11⅛ inches.

For more data circle **146** on Reader Service Card

★ ★ ★

## DRILL PRESS SAFETY GUIDES

A series of Themac drill press safety guides has been announced by the McGonegal Mfg. Co., East Rutherford, N. J. The guides prevent common drill press accidents and safely hold work with or without jigs. They eliminate all T-bolts and clamps and attach without drilling or removing any parts of the drill press. They provide accurate positioning for duplicate work and will easily hold and position a drill vise. The

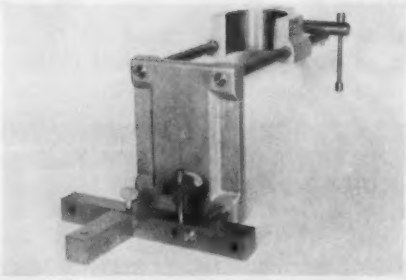


*Illustration showing view of Themac Model 2750-S Drill Press Safety Guide*

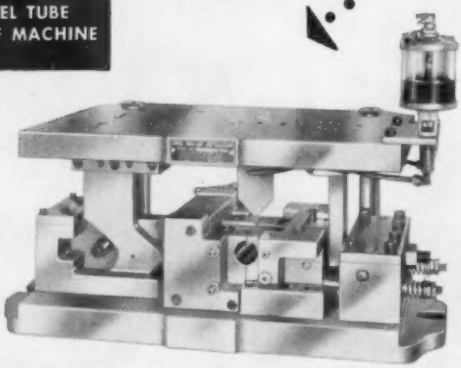
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*Cuts Tubing to Accurate Lengths in*
**SPLIT SECOND TIME!**

VOGEL TUBE CUT-OFF MACHINE

**LENGTHS of ½ inch or more are accurately cut to ± .010" with each stroke of press—actually less than ⅓ of a second or faster than any other known method. In addition to being rapid and precise, the Vogel Cut-Off also cuts clean with a minimum of burr and distortion. Many thousands of cuts can be made before shear blades require sharpening.**

**Unit No. 12 accommodates tubing up to ½" O.D. with 3/32" wall; the No. 2 takes tubing up to 2" O.D. with ⅛" wall.**



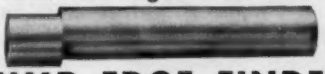
PATENTED

**Ask for sample showing how clean-cut your tubing can be sheared with this machine.**

**VOGEL** TOOL AND DIE CORPORATION
1823 NORTH 32nd AVENUE, MELROSE PARK, ILLINOIS

For more data circle **519** on Reader Service Card

*1 Minute*
*to locate an edge within .0005"!*



**JUMP EDGE FINDER**

**PRICE $2.50** Complete satisfaction — or full refund.
Postage free if payment with order.

**ELISHA PENNIMAN** ELMWOOD 10, CONN.

For more data circle 520 on Reader Service Card

**CAM MILLING**
**JIG BORING**



A SPECIALIZED CAM MILLING SERVICE,
JIG BORING
...SPOT WELDING
..CONTRACT PRODUCTION
EXPERIMENTAL DEVELOPMENT

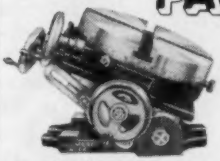
SEND FOR NEW CATALOG NO. 52-CN

**EISLER ENGINEERING CO., INC.**
734 S. 13TH ST., NEWARK 3, N. J.

For more data circle 521 on Reader Service Card

**PALMGREN**

ROTARY AND INDEXING TABLES FOR MILLING MACHINES, DRILL PRESSES, GRINDERS



No. 84 Tilting Indexing and Rotary Table $139.50



No. 86 Rotary and Indexing Table $69.95



No. 83 Rotary Table for Vertical Milling $79.95

64 different models and types of Palmgren vises, rotary tables, milling attachments and other machine tool accessories — the most complete line of vises and tables available anywhere. WRITE FOR CATALOG 204

**CHICAGO TOOL AND ENGINEERING CO., 8399 South Chicago Avenue, Chicago 17, Illinois**

For more data circle 522 on Reader Service Card

**TWO COMPLETE LINES OF BORING BARS**

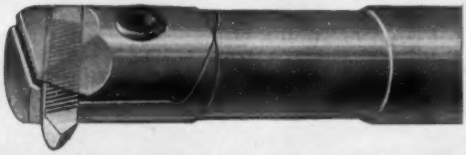


**R. B. SPIRAL RELIEF TYPE TOOLS**

HSS or with **solid** Carbide Heads are your best choice for high-precision lathe and jig-boring operations.

The new chatterproof all purpose bars in 25 standard sizes.

**R. B. BORING BARS**
with serrated HSS or Carbide Bits



*for free catalog write:*

**R. B. TOOL CO., INC.**
**785 No. Broadway**
**WHITE PLAINS, N. Y.**

For more data circle 523 on Reader Service Card

addition of a simple guide plate will provide an inexpensive jig for duplicate drilling. The guides may also be positioned on top of the work for drilling sheet metal and a stop may be placed on either side of the workpiece. Four different guides are available from the manufacturer.

For more data circle **147** on Reader Service Card

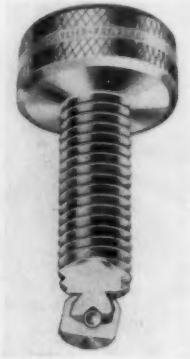
## KNURLED HEAD SWIVEL-PAD CLAMPS

Vlier Engineering, Inc., 8900 Santa Monica Blvd., Los Angeles 46, Calif., has added six additional sizes of knurled head swivel-pad clamps to its line.

The knurled head swivel-pad clamps were recently introduced for applications where finger-tight clamping is sufficient. These patented tools feature the unique Vlier ball-joint construction which provides adjustment and rotation of the pad to accommodate off-angle part surfaces. Since the pad stops when against the part, all screw torque is absorbed by the pad, protecting the part.

With the addition of the six new sizes the clamp is now available in 13 different sizes.

For more data circle **148** on Reader Service Card



*Vlier Knurled Head Swivel-Pad Clamp*





For more data circle **524** on Reader Service Card

**JIG BORING**

and

**Large Precision Machining**

Done to your specifications

**We Have 21 Jig Borers**

**KIDDE PRECISION TOOL CORP.**

18 LOCUST AVENUE, ROSELAND, N. J.

For more data circle 525 on Reader Service Card

**BRUSH TOP CANS**

***For Layout Blue!***



HANDY, ELLISCO BRUSH TOP CANS MAKE IT EASIER FOR YOU TO APPLY AND STORE LAYOUT BLUE. BRUSH KEEPS MOIST IN CAN. CONTENTS WON'T DRY OUT 3 OZ. TO 1 QT. CAPACITIES. GET DETAILS AND BULLETIN NO. 60A.

**George D. Ellis & Sons, Inc.**

4024 N. American St., Philadelphia 40, Pa.

For more data circle 526 on Reader Service Card



A NEW TYPE WALTER

**PRECISION DIVIDING HEAD**

- Operates Horizontally, Vertically
- Easy Handling
- For Quick, Plain, and Degree Indexing
- Versatility Increased by Various Accessories
- High, Long-lasting Precision

Each tool supplied with individual test report. Max. permiss. error chart supplied with literature.

**NEISE MODERN TOOLS** Model SHU

Sole Agents

**KARL A. NEISE, 404 4th Ave., New York 16, N. Y., Dept. MMS**

For more data circle 527 on Reader Service Card

Compensates for Spindle Misalignment

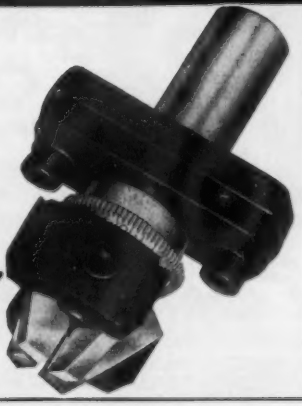
**KUTMORE**

**ADJUSTABLE HOLLOW MILLS**

The Midget Floating Holder Hollow Mill, flange type, has micrometric adjustment, and is designed to permit easy compensation for any spindle misalignment.

**WRITE TODAY FOR CATALOG 20MM**

It shows complete line of adjustable hollow mills. Our engineering department is at your disposal for special requirements.



**CARL WIRTH & SON, INC.**

1625 CLINTON AVE. NO.

ROCHESTER 5, N. Y.

For more data circle 528 on Reader Service Card

# CUT DRILLING COSTS

*Precision* HSS and CARBON TWIST DRILLS

Midget Twist Drills from .0059 dia. to 5/8" dia. straight shank



**STEP-UP DRILLING PRODUCTION LICK TOUGH DRILLING PROBLEMS THESE 4 PRECISION WAYS**

1. MORE HOLES AT LESS COST — Correctly hardened and deep-freeze treated for longer life, Precision drills give consistent, dependable performance.
2. MORE HOLES PER GRIND — Precision drills are made of tough, durable heat-treated steel to exacting specifications that guarantee longer drill life!
3. MORE ACCURATE HOLES — perfectly-pointed Precision drills are ground from solid hardened blanks on Precision-self-designed, hand-built machines which combine *point grinding and fluting* . . . GUARANTEE utmost accuracy . . . longer!
4. ECONOMICAL — Precision drills cost less . . . save you money . . . up to 15%!

**PROVE IT TO YOURSELF with Precision's NO-RISK UNCONDITIONAL GUARANTEE . . .**

**WRITE TODAY for FREE catalog!**

*Precision* Twist Drill & Machine Company

Dept. MMS-10, Woodstock St. –Crystal Lake, Ill.

Representatives — Distributors: Some Choice Territories Still Available

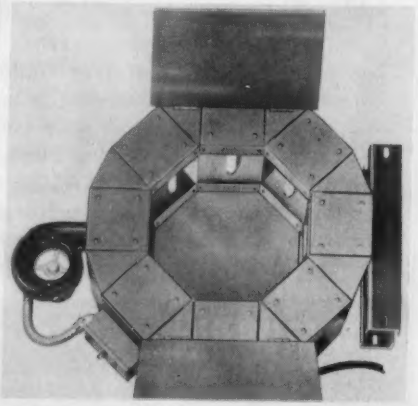
For more data circle 529 on Reader Service Card


*new shop equipment . . .*

## MIDGET INFRARED OVEN LABORATORY UNIT

The Fostoria Pressed Steel Corp., Fostoria, Ohio, has designed and developed a midget sized infrared laboratory oven for testing sample panels, paint, finishes, and also for dyhydrating, preheating and other similar operations. The ovens incorporate the quartz lamps, since these offer the most easily controlled, highest intensity source of infrared energy available. Pencil-thin quartz lamps, exceptionally resistant to thermal shock and impact, provide with maximum safety an intensity of 100 watts per inch of lamp length.

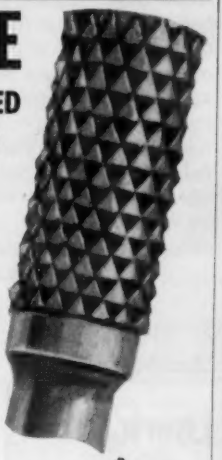
The accompanying illustration shows a small quartz lamp oven in a typical design for laboratory use, 16 inches deep with an opening of 13½ inches. It holds eight 1600-watt quartz lamps. At maximum operation with full voltage used, the connected load for this economical oven is 12.8 k.w. It is available as a complete unit including switch, ventilation blower, lamps and two hinged doors at front. Back of the



*Fostoria Infrared Laboratory Oven*

# CARBIDE

## SOLID and TIPPED CUTTING TOOLS



### *Stock Tools:*

Burrs—Carbide
Drills—Solid Carbide and Tipped
Internal Grinding Burrs—Solid Carbide
Reamers and End Mills —Solid Carbide and Tipped
Slitting Saws—Solid Carbide
Rotary Files H.S.S. — Hand cut and ground from the Solid

### *Specials:*

In addition to the foregoing, ESSEX maintains a special tool designing department and can supply the following in Solid Carbide and Carbide-Tipped Tools:

Counterbores
Step-Drills
Twist Drills
Dies
Grooving and Milling Cutters
Key Cutters
T-Slot Cutters
Router Bits
Profiling Cutters, Etc. to sketch or blueprint

Complete resharpening and reconditioning service available.

Areas available for distributors —inquiries invited.



*Makers of Fine Tools Since 1868*

**ESSEX ROTARY FILE & TOOL CORPORATION**
295 MADISON AVE. • NEW YORK 17, N. Y.

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# Attention Executives

Before You Buy
Precision Measuring Instruments

CONSULT

# OPTO-METRIC

*Specialists in Dimensional Quality Control and Exclusive Representatives for*

● Leitz

Optical Measuring Tools
Optical Dividing Heads
Optical Rotary Tables
Internal/External Gages
Toolmakers Microscopes

● Wilder

Optical Comparators

● GAGE

"Deep Etch" Comparator Charts.

*Write for Descriptive Literature*

**OPTO-METRIC TOOLS, INC.**
137 Varick Street • New York 13, N. Y.

For more data circle 531 on Reader Service Card

oven is closed, and interior is completely lined with specular gold plating which provides a reflection factor of 97 per cent in directing radiant energy to the product or material being tested.

Oven temperatures of approximately 1,000 degrees F. are possible in this compact laboratory unit, when operated at full intensity. Lower intensities, when required, are obtained in a number of ways. One method is to wire the oven on a series of parallel circuit, thus operating the lamps on reduced voltage. Transformers can also be used to reduce the voltage. While still another method is to operate the lamps between full and reduced voltage on a percentage basis, using an input controller and suitable container in order to obtain the desired results.

For more data circle **149** on Reader Service Card

★ ★ ★


**LUBRICATION ECONOMY**

**"We Recommend This Lubricant To Our Customers"**

says PACKAGE MACHINERY COMPANY

*"We have found LUBRIPLATE Lubricants very effective. To assure proper re-lubrication of our machines with LUBRIPLATE Lubricants, we tag them with lubrication instructions before shipment. Thus purchasers know the LUBRIPLATE product we recommend and where to obtain it."*

**ALSO MAKES CARS AND TRUCKS RUN BETTER AND LAST LONGER**




LUBRIPLATE H.D.S. MOTOR OIL . . . THE OIL THAT NEEDS NO ADDITIVES




1. LUBRIPLATE reduces friction and wear.
2. LUBRIPLATE prevents rust and corrosion.
3. LUBRIPLATE is economical to use.

Write today for case histories of savings made through the use of LUBRIPLATE in your industry.

**LUBRIPLATE DIVISION**
Fiske Brothers Refining Co.
Newark 5, N.J.—Toledo 5, Ohio

*The Different LUBRICANT!*

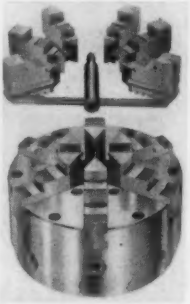
**DEALERS EVERYWHERE, consult your Classified Telephone Book**

For more data circle **532** on Reader Service Card

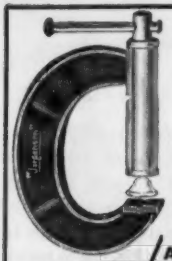

## ADJUSTABLE CHUCKS

Ajust-Tru chucks, 3 and 6 jaw models, of 8, 10, and 12 inch diameters have been announced by the Buck Tool Co., 514 Schippers Ln., Kalamazoo, Mich. Previously the largest size universal Ajust-Tru chuck was of 9 inch diameter.

The new large chucks provide all



*View showing Buck Tool Ajust-Tru Chuck*



"Jorgensen"
and "Pony"
CLAMPS
ASK YOUR SUPPLIER.
send for free catalog.
the clamp folks / ADJUSTABLE CLAMP CO.
436 N. Ashland, Chicago 22, Ill.

For more data circle 533 on Reader Service Card



NEW NESTING TYPE
TOTE PANS
Sturdy 16 ga. metal. 20" long x 12" wide x 6¼" deep. Drag holes and handles at both ends.
J. L. LUCAS & SON, INC.
Bridgeport 5, Conn.

For more data circle 534 on Reader Service Card

Rowbottom for Cams



CAMS You specify . . . . . we'll produce
Any quantity . . . quickly
Our half-century's highly specialized experience is assurance your needs will be promptly met . . . at worthwhile savings. Accuracy guaranteed. Submit samples or drawings for estimates.
THE ROWBOTTOM MACHINE CO.
WATERBURY • CONNECTICUT
Also builders of Cam Milling and Cam Grinding Machines. Details on request.

For more data circle 535 on Reader Service Card

New "Series 333" Drills for Drilling Cast Iron!




ACE
CARBIDE DRILLS

Whatever your carbide drill requirements may be . . . whether solid carbide or carbide tipped . . . it always pays to make sure you use an "ACE". Their "ground-from-the-solid", highly polished flutes have keener, stronger cutting edges. And that means finer accuracy, longer tool life, and lower drilling costs for you!

Call your local Ace Drill Distributor today!



ACE DRILL
ADRIAN, MICHIGAN
ORIGINATORS OF "GROUND-FROM-THE-SOLID" DRILLS

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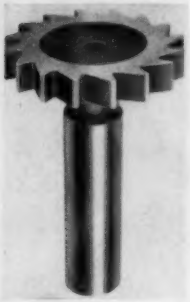
the features of the smaller sizes: adjustment to dead true within a minute, guaranteed precision within 0.0005 inch chucking duplicate pieces, automatic take-up for wear, and surer grip with less distortion by the 6-jaw models. The chucks are constructed for heavy-duty work.

For more data circle **150** on Reader Service Card

## COMPLETE LINE OF KEYSEAT CUTTERS

A complete line of Woodruff keyseat cutters has been announced by Fastcut Tool Co., 7405 E. Davison, Detroit 12, Mich. Made of fine grade high-speed steel, the cutters are available in 41 stock sizes. These sizes cover American Standard Numbers 202 through 1212. Cutters are all right-hand with ½ inch shank. Featuring a 5 degree positive rake angle to assure fast, accurate cutting, these cutters are precision ground and scientifically hardened by a special heat treating process. Strict quality control methods on every phase of production is said to assure quality, precision and long tool life on all standard cutters, as well as on special sizes made to meet customers' specifications.

For more data circle **151** on Reader Service Card



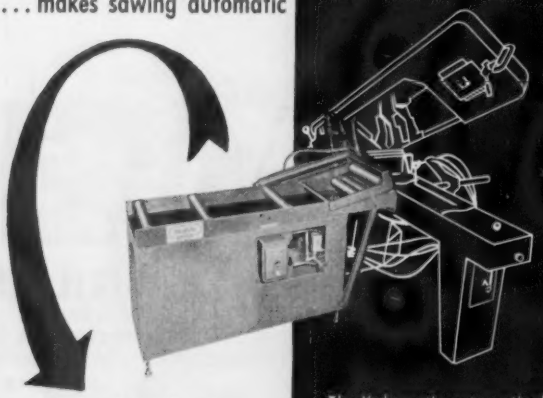
*View showing Fastcut Tool Keyseat Cutter*


*The*

**KALAMATIC**

. . . makes sawing automatic

**AUTOMATIC BAR-FEED ATTACHMENT**



*Featuring:*

- Quick easy installation and adjustment.
- Accurate repetitive cutting with no intricate electrical equipment to go out of balance.
- Completely enclosed oil tank and ball bearing table rollers.

The Kalamatic automatically feeds rounds, flats, hex, pipe, tubing to most Kalamazoo metal cutting band saws—any length from 3/16" to 30". Thoroughly automatic, The Kalamatic helps prolong the blade life of the saw.

Machine Tool Division

**Kalamazoo**

TANK and SILO CO.
508 HARRISON ST.
KALAMAZOO, MICHIGAN

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GRANT RIVETERS



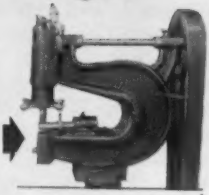
• Pioneers in the riveting field. Head rivets from smallest to ¾" diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles. *Write for literature—and don't forget to send samples.*

**THE GRANT MFG. & MACHINE CO.**
**96 Silliman Ave. Bridgeport 5, Conn.**

For more data circle **538** on Reader Service Card

**DOUBLE-DUTY WITH ONE MACHINE**

*TO INCREASE*
**PROFITS**
*TO SAVE*
**TIME**
**TUBE CUTTING ATTACHMENTS**
*FOR ALL SIZES NIBBLER TYPE*
**SAVAGE**



**NIBBLING MACHINES**

FOR SLOTTING, SHAPING, CUTTING OFF SPECIAL TUBING-ENDS — USING GUIDE-LINE OR TEMPLATE.
TUBE-CUTTING ATTACHMENTS EASILY REMOVED FOR STANDARD NIBBLING.
*Quotation on Request*

**W. J. SAVAGE COMPANY**
KNOXVILLE *Since 1885* TENNESSEE
*NIBBLING MACHINE PIONEERS*

For more data circle **539** on Reader Service Card

STEEL
**CHICAGO PRESS BRAKES**

**43 Standard Sizes**

Readily adapted for a wide variety of bending, forming drawing, notching, blanking, punching, embossing, etc.

***DIES*** Complete Line of Induction Hardened Dies for All Makes and Sizes of PRESS BRAKES.




4914

DREIS & KRUMP MANUFACTURING COMPANY
**7418 S. Loomis Boulevard, Chicago 36, Illinois**

CHICAGO
STEEL BENDING BRAKES
BOX and PAN BRAKES
PRESS BRAKES

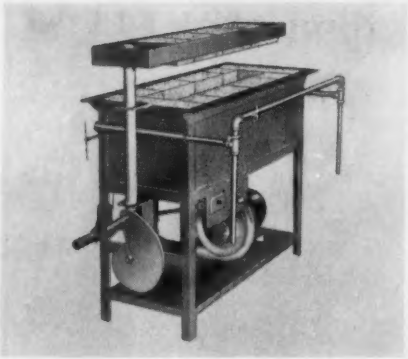
For more data circle **540** on Reader Service Card

*new shop equipment . . .*

## GAS FIRED FORGE FURNACE

A gas fired forge furnace has been designed and manufactured by the Johnson Gas Appliance Co., 571 East Ave. N.W., Cedar Rapids, Iowa. The furnace is listed as Model No. 133 and is intended for use in blacksmith shops, agricultural and vocational shops, and machine shops. The forge provides the high, fast heat needed for sharpening and forging parts and tools. It burns all types of gas and is equipped with four burners with separate shut-off valves on end burners. The forge is rated at 370,000 maximum B.T.U. input per hour.

The body is made of heavy steel. The firebox is heavily insulated and measures 5½ inches wide, 7½ inches deep and 27 inches long. All wearing surfaces are of hard firebrick. The refractory lid is mounted on a pivot pole and is adjustable.

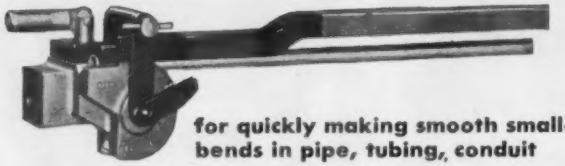


*Johnson No. 133 Gas Fired Forge Furnance*

It measures 30 inches high overall by 40 inches long; the shipping weight is 570 pounds.

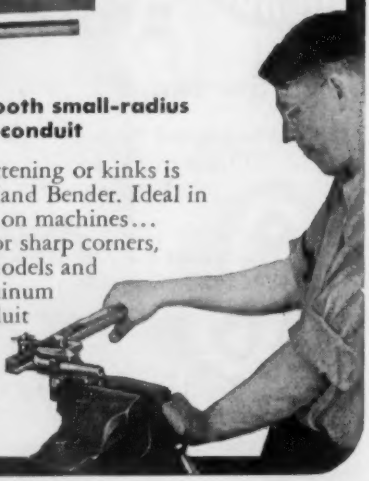
For more data circle **152** on Reader Service Card


GREENLEE HAND BENDER



**for quickly making smooth small-radius bends in pipe, tubing, conduit**

Forming small-radius bends without flattening or kinks is simple, speedy work with a GREENLEE Hand Bender. Ideal in the shop for pipe and tubing installations on machines... especially designed to form neat bends for sharp corners, nooks and other close quarters. Various models and sizes for steel, copper, brass and aluminum tubing or pipe, rigid and thin-wall conduit



TOOLS FOR CRAFTSMEN
GREENLEE

**GET FREE FOLDER E-207 AND BOOKLET E-201.** Complete facts and prices on the Greenlee Bender line. Write Greenlee Tool Company, Herbert Avenue, Rockford, Illinois.

For more data circle **541** on Reader Service Card

# NUMBERALL

CUTS THE COST OF STAMPING NUMBERS

## MODEL 70

**MULTI-WHEEL NUMBERING MACHINE**

The most efficient method of stamping numbers into metal. Repeats the same numbers until changed. Model 70 NUMBERALL Machines are used in all industries to mark various parts. Stamps numbers, etc., quickly . . . neatly. Perfectly aligned. Much better marks are produced by these machines than by single stamps or steel type, and at a far lower cost. Shank for Hand or Press and with any number of wheels from 3 to 20. Can be furnished in 1/32" to ⅜" high figures, sharp face gothic or shaded roman style.



Hand shank illustrated. Press shank for foot or power presses also available.

*Write for Bulletin MS-70.*

**NUMBERALL STAMP & TOOL CO.**
HUGUENOT PARK, STATEN ISLAND 12, N. Y.

For more data circle **542** on Reader Service Card

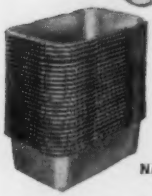
# "PAK-N-STAK"

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Bathey



Leak proof drawn steel. Most economical pan offered to industry



Nested

Length 18¼"
Width 11"
Depth 5½"



Stacked

Dealers in principal cities.

Write for catalogue

MBC

**BATHEY MFG. CO.**
100 SO. MILL ST. PLYMOUTH, MICH.

For more data circle **543** on Reader Service Card




# Miccro Spray

## LAY-OUT DYE

(Purple)

MICCRO Lay-Out Dye, long the leader in its field, now available in an AEROSOL package for SPRAYING.

All the advantages—instant drying; clear, sharp lines—*plus* easy-to-use, dependable, efficient MICCRO Spray container.

•

Regular MICCRO Supreme Lay-Out and Identification Dye in seven distinctive colors available as always in brush-in-cap and conventional containers.

***Write for circular on company letterhead***

**MICHIGAN CHROME & CHEMICAL COMPANY**
8615 Grinnell Ave., Detroit 13, Mich.

For more data circle **544** on Reader Service Card

## CENTERLESS GRINDING AND FINISHING MACHINE

Production Machine Co., Greenfield, Mass., has announced its Type 614 centerless grinding and finishing machine. The machine is heavily constructed and is precision built for grinding and finishing tubes and bars at fast production rates. The abrasive belt feed unit is mounted on heavy cast iron dovetail ways and is regulated by feed screw micrometer hand wheel within easy reach of the operator.

The wheel spindle is mounted on heavy precision bearings and is of the taper nose design for accurate location of wheel mounts. Using abrasive belts and contact wheels, this machine has many features not found in the conventional type machines using bonded wheels. Versatile in design, the machine can be equipped with steel contact wheel for heavy stock removal using coarse or medium grit coated abrasive belts. According to the manufacturer, in a matter of minutes both the contact wheel and belt may be changed to obtain smooth, low micro finishes.

The machine has changing traverse direction. For many grinding and finishing applications this feature is important and can reduce material handling costs to a minimum, particularly on bar or tube work where more than one pass is required and tandem installations are not practical. Machines so equipped may be operated manually or automatically.

For more data circle **153** on Reader Service Card

★ ★ ★

## THREE-STEP TYPE DRILLS

Hi-Duty Drill Works, Fleetwood, Pa., has announced the latest additions to its line, three step drills. The drills are used for drilling two or more

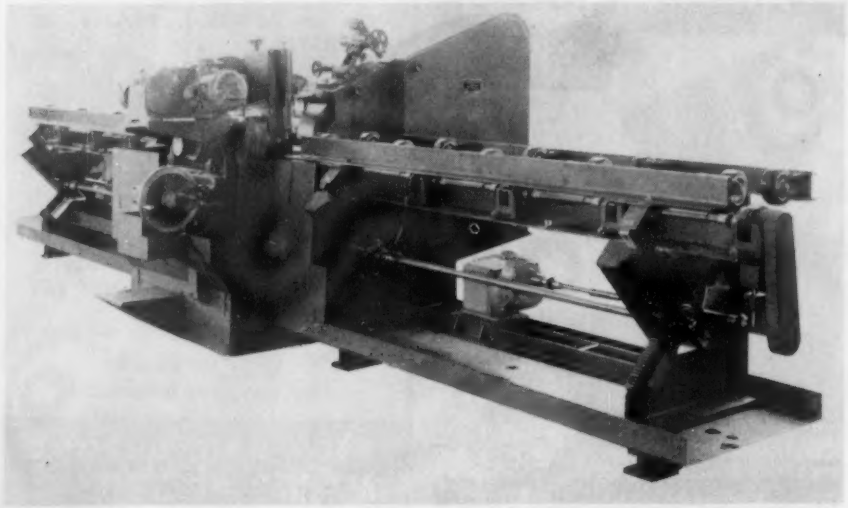


*Illustration showing view of Production Centerless Grinding and Finishing Machine*

# SLOCOMB MICROMETERS

**MADE STRONGER to LAST LONGER**

the new, modernized Slocomb Micrometer has 14 exclusive features that mean greater accuracy and longer wear. New non-glare satin chrome finish on thimble and sleeve. Over 700 different models. Quick repair and reconditioning service.

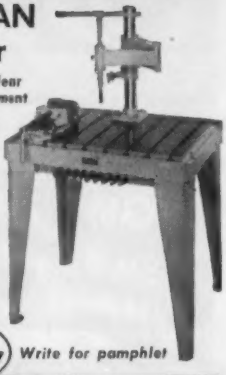
J. T. SLOCOMB CO.
Glastonbury, Conn.

For more data circle **545** on Reader Service Card

Save 70% of your present free hand tapping time with this

## NEW ALLMAN hand tapper

- Articulate arm swings clear of large table for placement of work
- Limitless number and sizes of tapped holes without moving work piece
- Vise holds work as small as 3/8" square
- Floating tap locates itself in hole
- Individual spindle holds taps, thus change requires only seconds



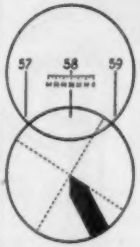
TOOLS, INC. *Write for pamphlet*

1734 No. 25th Ave. • Melrose Park, Ill.

For more data circle **546** on Reader Service Card

## new SCHERR TOOLMAKERS MICROSCOPE

WITH INTERCHANGEABLE DIAL TEMPLETS AND OCULARS




Reading Angles in Minutes

Thread Templets for U. S. National Thread Profiles-6-80 Pitch. Radii Templets, etc.





LARGE MICROMETER DRUMS READ DIRECTLY IN .0001"

Measuring Range 2" x 1-1/2" and other sizes

*A moderately priced PRECISION MEASURING TOOL for Toolroom and Inspection*

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Geo. SCHERR OPTICAL TOOLS, Inc.

200-MM LAFAYETTE STREET • NEW YORK 12, N. Y.

For more data circle **547** on Reader Service Card

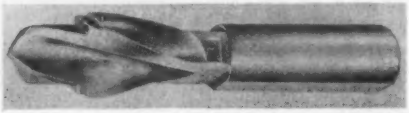


*Illustration showing Hi-Duty Step Drill*

diameter holes simultaneously and are used frequently for counterboring and countersinking operations. The manufacturer makes these drills in sizes 0.190 inch to 5 inches in diameter and lengths up to 40 inches.

For more data circle **154** on Reader Service Card

★ ★ ★

## FORGED HOIST HOOKS

J. H. Williams & Co., 400 Vulcan St., Buffalo 7, N. Y., manufacturer of industrial and automotive wrenches, tools and drop-forgings has extended its hoist hook line to include 40 and 50 ton capacity sizes.

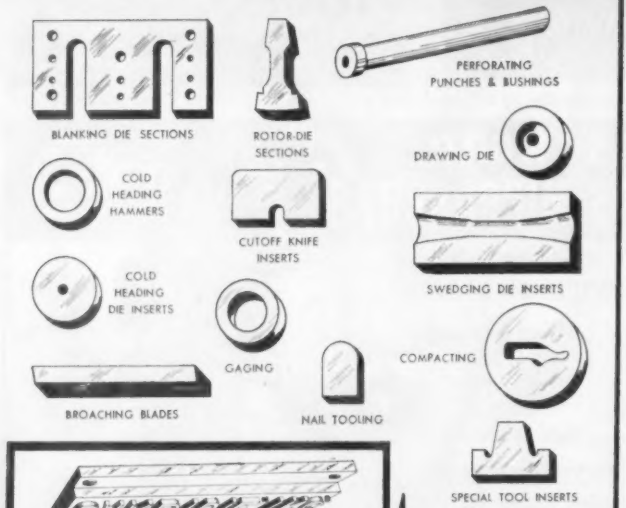
Forged in closed dies, these hooks bring a new degree of accuracy, safety and uniformity of design to the heavy capacity range of shank pattern hoist hooks.

To insure proper service at listed capacity, each hook, after heat-treatment, is proof-tested on a standard tension



***Williams Hoist Hook***

**NOW! 7 to 10 DAY DELIVERY**
**on Special Shape Carbide Inserts of Proven Quality!**




CARBIDE, INC.
29 HILLVIEW AVE.
LATROBE, PA.
Phone: KEystone 7-6781 - 7-4811

*It's a fact* send us an order and we will deliver!

For more data circle **548** on Reader Service Card

## Magnetic Base Indicator holders




Erick
Magna Holder
Model 200B
Only $5.45

See your dealer or write for catalogue 755 on the most complete line of magnetic base units & access. mfg'd.

CULLEN MFG. CO., RACINE, WIS.

For more data circle 549 on Reader Service Card

# CAMS

MADE TO YOUR SPECIFICATIONS

—Except Screw Machine Cams—

Design Assistance Offered

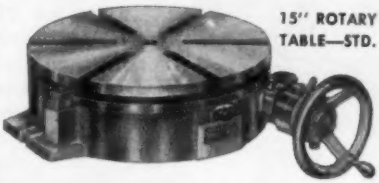
KIDDE PRECISION TOOL CORP.

15 LOCUST AVENUE, ROSELAND, N. J.

For more data circle 550 on Reader Service Card

## The *STEVENS* Line SINCE 1925

### Introducing NEW series



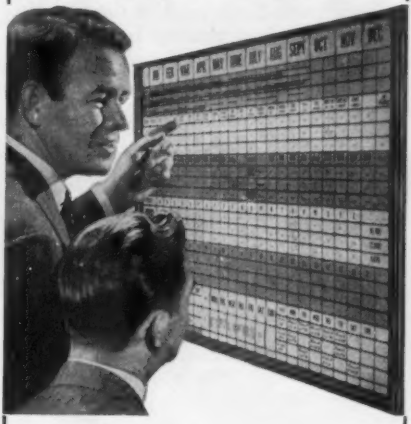

ROTARY TABLES, 5-7½-8-12-15-18-24" sizes both standard and dial indexing types
ADJUSTABLE TILTING TABLES, #0-1-2
COMPOUND TABLES, #1-2
ROTARY-COMPOUND TABLES, #1-1½-2
INDEX CENTERS—multiple spindle
SPECIAL MACHINES—designed and built

*See your dealer or write for bulletins*

The John B. Stevens Company
Main Street, Somersville, Conn., U. S. A.

For more data circle 551 on Reader Service Card

## You Get Things Done With Boardmaster Visual Control



☆ Gives Graphic Picture of Your Operations — Spotlighted by Color

☆ Facts at a glance—Saves Time, Saves Money, Prevents Errors

☆ Simple to operate — Type or Write on Cards, Snap in Grooves

☆ Ideal for Production, Traffic, Inventory, Scheduling, Sales, Etc.

☆ Made of Metal. Compact and Attractive. Over 100,000 in Use

Complete price $49.50 including cards

FREE — 24-PAGE BOOKLET NO. MS-50 Without Obligation

*Write for Your Copy Today*

GRAPHIC SYSTEMS

55 West 42nd Street • New York 36, N. Y.

For more data circle 552 on Reader Service Card

machine to 50 per cent beyond its safe working load. Each hook is then marked so that it may readily be identified as having been so proof-tested, according to the manufacturer.

For more data circle **155** on Reader Service Card

## VERSATILE INDEXING DRIVES

A complete line of Geneva movements has been announced by the Genevamatic Engineering Co., 404 E. Ellamae, Tampa, Fla., to provide a reliable yet inexpensive way of converting rotary to intermittent or indexing motion. These units are made with 3, 4, 5, 6, 8 indexing stations with any hub, bore key-way combination desired, including ball-bearing mounting. They are widely used in the packaging, chemical, food - processing, armature winding, cutting tool, metal sintering, automotive and other industry that requires automatic positioning. Drives, in any number of points, are made with shell outside diameter from as small as a dime to as large as 20 inches. Materials used in manufacturing the drives are mild steel or heat-treated machinery steel, if desired.

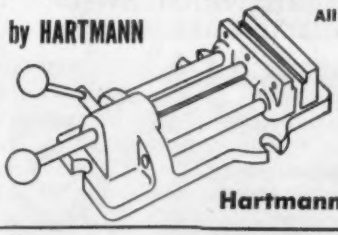
The drives are offered in both the commercial and precision size. For economical purposes, the commercial sizes are best used where adjustable center distance of wheel shaft or driver shaft or




For more data circle **553** on Reader Service Card

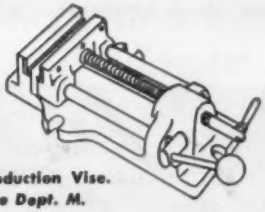
**INSTANT ACTION** **RAPIDSET**

**by HARTMANN**



**All Purpose Tool Room And Machine Shop Vises.**

**The JAWSET**



**Adjustable Pressure Production Vise.**

***For Information Write Dept. M.***

**Hartmann Mfg. Co., 1637 Goold St., Racine, Wis.**

For more data circle **554** on Reader Service Card




**DYKEM STEEL BLUE®**

**Stops Losses**

**making Dies and Templates**

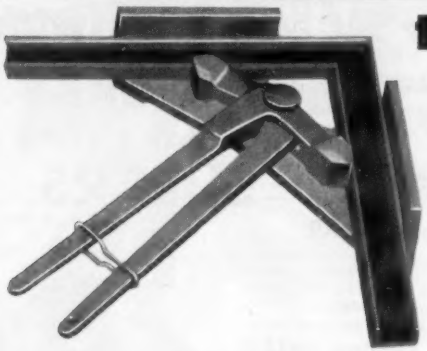
Popular package 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

***Write for sample on company letterhead***

**THE DYKEM COMPANY**

**2301F North 11th St. • St. Louis 6, Mo.**

For more data circle **555** on Reader Service Card



# the POLYP

## SQUARE SPANNER

## WELDING FIXTURE

- Positive grip eliminates "creep" usually associated with welding.
- Assures infinitely greater precision.
- Permits "assembly line" methods for job lots of similar or varied work.

A device to aid in holding stock in position for welding right angles or butts of similar or varied shapes. Clamps rounds, squares, angles, "T" or "H" shapes up to 2¼".

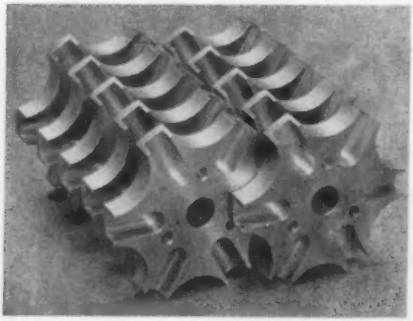
Use one for sample welding jobs or use several for pre-welding set-ups of more complicated jobs.

**Ask your welding supply dealer or write Dept. M-8**

**FIREARMS INTERNATIONAL CORPORATION**

**4837 Kerby Hill Road, Washington 22, D. C.**

For more data circle **556** on Reader Service Card



*View showing Genevamatic Indexing Drives*

both is permissible. Precision sizes are used where shafts fit into jig-bored housing where center distance adjustment is not provided.

For more data circle **156** on Reader Service Card

## AUTOMATIC GAGE MEASURES AND SORTS WATCH JEWELS FOR SELECTIVE ASSEMBLY

Federal Products Corp., 6144 Eddy St., Providence 1, R. I., has developed a special automatic gage for measuring and sorting tiny watch jewels for selective assembly. The Model 144-B-58 gage checks the jewels which must have a precise hole, 0.0008 inch in diameter. The gage then sorts them, into four acceptable categories plus oversize and undersize, at a speed to 1,800 pieces an hour. The four good classifications differ by 0.0001 inch.

Because an ordinary gaging contact will not fit into the hole, the measurement is made by inserting a tapered, needle-like contact and measuring its depth of penetration. The needle is connected to an electronic gage head by means of a frictionless motion-transfer unit and the depth of its penetration

★ ★ ★ ★ ★


**Save Time . . . Labor . . . Materials with**



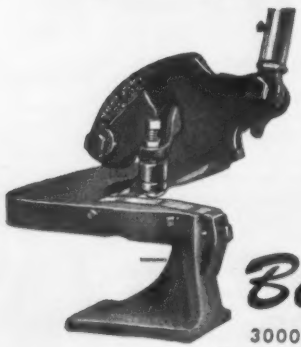
**Inside SLOTTER**

Make cuts up to 8" inside edge of sheet. Sharp, clean burr-free cuts always assured. Cap. 16 ga. High strength aluminum alloy body; H.C.H.C. blades.

**BEVERLY metal cutting SHEARS**

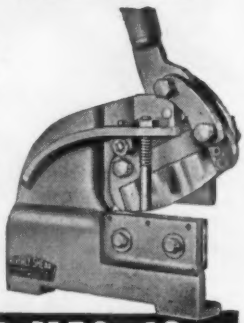
**Throatless SHEAR**

Make any cut—straight, irregular, curved. Exclusive design permits turning work any direction while cutting. 4 models—capp. to 3/16".



**Slitting SHEAR**

New "55" Series — easier cutting with compounded linkage. 3 models—cap. to 3/16"; trimming capacity to 5/16" mild.



*See your Beverly Distributor. Write for FREE Illustrated Bulletin.*

**Beverly SHEAR MFG. CO.**

3000 W. 111th STREET • CHICAGO 43, ILLINOIS

For more data circle **557** on Reader Service Card

# WHOOT MON!



You really get your money's worth when you buy precision screw machine products made by "you know W.H.O.*"

CAP SCREWS • COUPLING BOLTS
SET SCREWS • MILLED STUDS
. . . our specialty.

*Wm. H. Ottemiller Co.
YORK, PENNA.

For more data circle 558 on Reader Service Card

# WALLS TU-WAY BELT SANDER

USE IT EITHER WAY




At last, a top quality industrial sander that provides all the most wanted features – yet sells for so little. $89.95
complete with cord, plug, switch ready to use

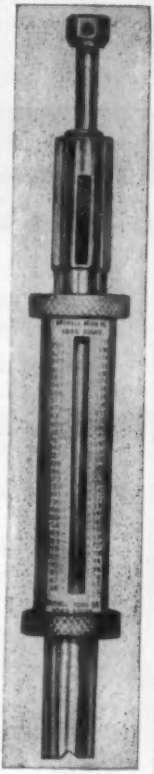
*Illustrated Literature on Request*
A few desirable distributor territories still available.

**WALLS SALES CORPORATION**
333 Nassau Avenue Brooklyn 22, N. Y.

For more data circle 559 on Reader Service Card

# Checks Hardness of Any Surface

from armor plate to 3/8-inch wire with the **ST-5 PORTABLE Hardness Tester**



This instrument measures surface hardness by height of rebound of a steel hammer while held in vertical position. Due to the locking of the steel hammer at maximum rebound, a direct reading is possible, eliminating any guesswork or estimating.

The tester is intended for shop use, reads Brinell 3000-kg. and Rockwell C scales up to 67. It is designated as Model ST-5. A movable scale makes calibration easy by checking against any known hardness.

Accessory equipment includes carrying case, test blocks and a test stand to hold parts weighing less than 15 lb. or with irregular surfaces. *Write for bulletin.*

**Additional distributorships available.**

**Write for details.**

**Mechanical Devices, Inc.**
10640 HARPER AVE.
DETROIT 13 • MICHIGAN

For more data circle 560 on Reader Service Card

determines the size category of the jewel. In this type of measurement, the taper of the needle is extremely critical and must be held to close tolerances to be sure that the size of the needle



*View of Federal Special Automatic Gage*

does not affect the measurement. Also, the thickness of the jewels cannot exceed certain limits for it, too, could affect the accuracy of the hole measurement.

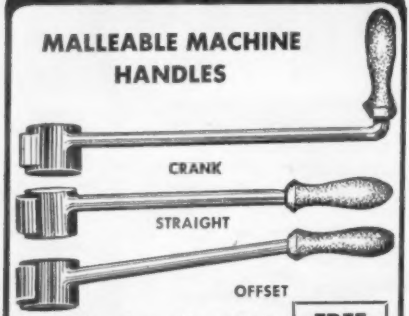
When ready for gaging, the jewels are hopper-fed to a rotating table and carried to a chute leading to the gaging station. They are fed one at a time into the chute and then into gaging position. With the hole in a vertical position, the needle is inserted to take the measurement. The result is transmitted from the gage head to an electronic classifier which signals a rotating wheel containing the disposal cups so that the correct cup will be under the disposal chute to receive the jewel. There is a disposal cup for each size category plus those for undersize and oversize.

For more data circle **157** on Reader Service Card


REID

TOOL ROOM ACCESSORIES

MALLEABLE MACHINE HANDLES




Finest and most complete available. Made in 3 styles and in a large variety of sizes. Well proportioned. Neat in appearance. Smooth finish. Stands up under severe usage. Low prices. ALSO plastic and steel ball handles. C.I. hand knobs, compression springs, etc. Finest quality. Low prices.

FREE NEW 60-Pg. CAT.

REID TOOL SUPPLY CO.
MUSKEGON HEIGHTS, MICHIGAN

For more data circle **561** on Reader Service Card

*You Need an Extra Hand Now to Speed Up Production!*

HEIMANN TRANSFER SCREW SETS



IN 11 SIZES—No. 6 to 1" N.C. In all S.A.E. sizes.

Here is the *faster*, more precise way of transferring open and blind screw holes—make savings in "wage-dollars-per hour" of your expensive hands on every job. A die-and-tool maker's tool with many other applications for die makers and machinists. A set of 6 Hardened Screws nested in combination holder and wrench—no other tools needed. Get more work *now*—save money too!

HEIMANN MFG., CO. ● URBANA, OHIO

For more data circle **562** on Reader Service Card



Do you save money with several Accuracy jeopardizing set-ups when one set-up could do your work?

We think not! **BUT:**

**With our WOHLHAUPTER MASTERHEAD IN ONE SET-UP you do boring, facing, recessing, undercutting, turning, etc. on ONE machine and • Save considerable time • Increase production • Increase efficiency • Utilize your present machine part more economically.**

9 models of the WOHLHAUPTER MASTERHEAD available with capacities up to 31¼".

All models have automatic feed and automatic end release.

Multiple feed models have 12 slide feeds.

Also Automatic Tapercutting Heads for Angles 0-180°, inside and outside.

**KARL A. NEISE** 404 4th Ave., Dept. MMS New York 16, N. Y.

NEISE MODERNTOOLS

For more data circle **563** on Reader Service Card

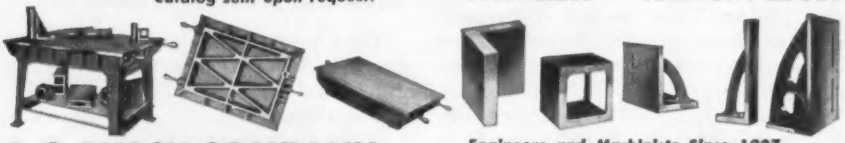
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# MILWAUKEE *Precision* EQUIPMENT

**Designed and finished for true dimensional accuracy. Highest grade semi-steel.**

***Catalog sent upon request.***

***SURFACE PLATES — ANGLES — PARALLELS — STRAIGHT EDGES***



**J. C. BUSCH COMPANY**

***Engineers and Machinists Since 1907***
**126 E. PITTSBURGH AVE.—MILWAUKEE 4, WIS.**

For more data circle **564** on Reader Service Card

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# The New Improved *Fluid Feed* ROTARY TABLE

Deftly holds and delivers small parts to drill, tap, swage, stake, etc. 8, 12 or 24 stations accurate to .003". Positive, uniform air-hydraulic indexing—not a mere hydraulic check. Indexes slow or fast, up to 2800 per hour. Compact and sturdy, easy to tool and hook up. Standard dial plate 12" x ½" ground steel. For a new job, simply tool up a new dial. Readily combines with "MEADMATIC" Timer, Air Hammer, Air Press, Drill Presses, etc.—to make almost completely automatic machines — operator merely loads.




***Send for new Air Power catalog today!*** (See Volume IV Thomas' Register for nearest distributor's address, phone number.)

**MEAD SPECIALTIES COMPANY**

**4114 N. Knox Ave., Dept. AA-106, Chicago 41, Ill.**

**PATHFINDER IN AIR POWER AUTOMATION**

For more data circle **565** on Reader Service Card

## AUTOMATED PISTON LINE SPECIAL MACHINE

LaSalle Tool Inc., 3840 E. Outer Dr., Detroit 34, Mich., has announced its latest automated piston machine. The machine combines a "Dial-Type" and an "In-Line Type" machine to form a single unit.

The LaSalle Automated Piston Line is a fully automatic unit, with 14 stations: five stations in the "Dial Type" section of the unit and nine stations in the "In-Line Type" section of the unit. It is designed to produce 400 pistons per hour and will handle, or process, any one of three different pistons merely by changing the position of the selector switch and fixture locators. It is built to J.I.C. hydraulic and electrical standards with automatic lubrication throughout. A chip conveyor is provided in the base of the unit. According to the manufacturer, the pistons are never slid, rolled or bumped, therefore, quality is maintained. The shuttle mechanism can be adjusted for different size and shaped pistons, which automatically allows for future model changes.

The pistons, as they come from the mold, are fed on a conveyor directly to the machine.

For more data circle **158** on Reader Service Card

★ ★ ★

## GUIDE FOR COMPARING MILLING MACHINE SPECIFICATIONS

The Greaves Machine Tool Co., 2700 Eastern Ave., Cincinnati 2, Ohio, has announced a time-saving "Slide-Guide" and is offered without cost to engineers, production men or purchasing agents who are responsible for the selection of milling machines.

The device provides at-a-glance com-

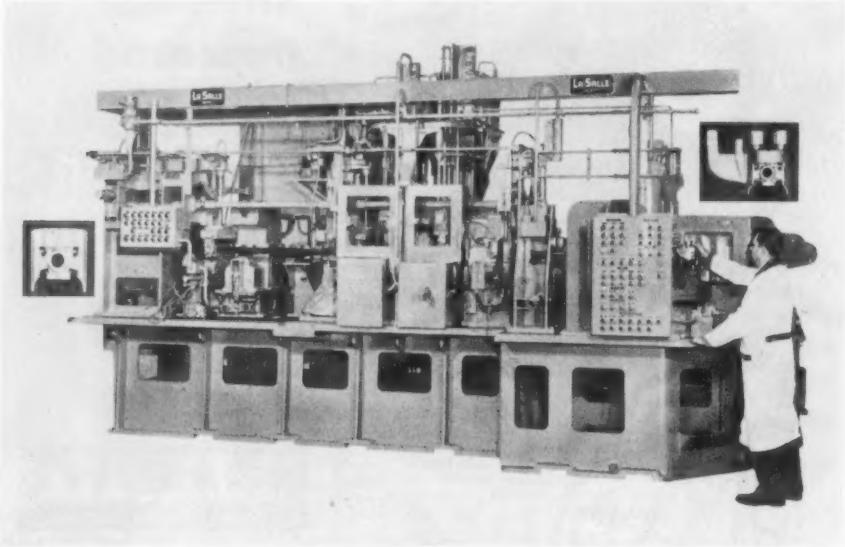


*Illustration showing LaSalle Special Fully Automatic Piston Line Machine in operation*

2 tools in 1



Costs less than one single purpose bar

**DUAL PURPOSE STUB BORING BAR**

for cutter bit at a 60° angle and end slot for cutters

**For all makes of turret lathes, automatic chuck machines, engine lathes, precision bore machines, etc.**

Made of alloy steel—black penetrated as a lifetime rust resistant—precision machined, hardened and ground. Stocked in stand. sizes—ETW 75 to 250.

**OSCAR F. BRAUER CO.,**
10111 Edgewater Dr., Cleveland 2, Ohio

For more data circle **566** on Reader Service Card

# CAMS

Fully equipped modern machine shop with extensive **Jig Boring, Surface Grinding, Horizontal Boring** and **Thread Grinding** facilities as well as modern **Cam Milling** and **Cam Grinding** equipment.

***Your Inquiries Answered Promptly***

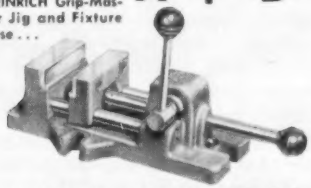
**HIMOFF MACHINE CO., INC.**
23-16 44th Road Long Island City 1, N. Y.

For more data circle **567** on Reader Service Card

# A Simple Formula for Solving Tooling Problems

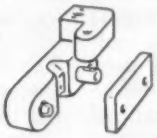
No need to start from scratch . . . use the HEINRICH Grip-Master Jig and Fixture base . . .

**A + B**

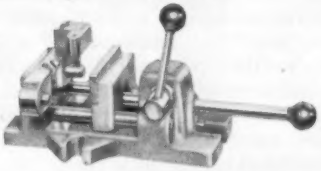


Simply add false jaws and bushing plate.

**= C**



Result . . . an accurate, low-cost Drill Jig.



**HEINRICH TOOLS, Inc. Dept. 116-K RACINE, WIS.**

For more data circle **568** on Reader Service Card

# *Commander* TAPPER

- **Wider Range . . . 1 Tapper Handles No. 0 to 3/4" Taps**
- **Automatic Tap Protection**
- **Furnished to fit *any* Drill Press**

**Commander — "The Tapper That Thinks For Its Operator," has the adjustable full range torque control that instantly stops any tap when it becomes dull, loaded, strikes a hard spot or bottoms in blind hole tapping. Assures maximum tap protection, higher production, even with inexperienced operators.**

**Your nearby Commander Distributor can give you a demonstration in your own plant. Write for his name and a copy of the NEW Commander Full Line Catalog.**



**Any operator does precision tapping with a *Commander* TAPPER**

**COMMANDER MFG. CO.**
**4224 W. Kinzie St. Chicago 24, Ill.**

**Product of *Commander* . . . Builder of the *Multi-Drill***

For more data circle **569** on Reader Service Card



*Illustration showing Greaves "Slide-Guide"*

parisons of 21 essential specifications to be considered in purchasing a milling machine. The handy 7 x 15 inch slide rule shows specifications for eight leading mills. Table sizes, speeds, feeds, capacity data and power specifications are among the detailed information provided on the slide rule.

All specifications included have been taken from printed literature. It provides, in an easy-to-use form, material formerly available only by separate investigation of catalog information of the various manufacturers.

For more data circle **159** on Reader Service Card

★ ★ ★

## AUTOMATIC LOADER HANDLES INTERNAL GEARS

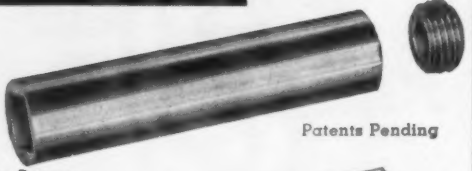
A Red Ring fully automatic loading device for handling spur or helical internal gears on shaving machines has been developed and put on the market by National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich. The loader solves a difficult automatic loader design problem — that of meshing the teeth in an internal gear with those of the helical gear-shaped shaving cutter. An intermediate air-powered loading sleeve mechanism which re-

★ ★ ★ ★ ★


**How SQUARE HOLED SLEEVES SPEED UP TOOL-MAKING!**

One of the most difficult problems in tool making can be solved easily and quickly with Sturdy Square Holed Sleeves. The perfection of broached square holes can be had in boring bars, milling cutters and many other applications at a small fraction of the cost of imperfect hand-make square holes. The Sturdy Square Holed Sleeve consists of a round sleeve with a perfectly square hole broached through the center. This hole is tapped at one end to receive a back-up screw which is furnished with the Sleeve. The Sleeve can be sweated or pressed into a drilled and reamed hole to make a perfectly square accurate hole in a very few minutes.

The Sturdy Square Holed Sleeve will save you many hours and many dollars in the making of boring bars, tool holders and other tools requiring square holes.



Patents Pending



SLEEVES MADE IN FOLLOWING SIZES:
3-16, 1-4, 5-16, 3-8, 7-16, 1-2, 5-8, 3-4, 1"

**STURDY BROACHING SERVICE, INC.**

23516 TELEGRAPH ROAD • DETROIT 19, MICH.

*Write for Literature*

For more data circle **570** on Reader Service Card

## IMPROVE PRODUCTION—LOWER COSTS THE HIGH-SPEED WAY

### —NEW SOLENOID PUNCH



Blow delivered in 1/5 sec. cycle on 110 volt single phase power. Exclusive positive alignment spindle design. Stakes, rivets, marks, cuts off, bends and crimps, etc.

***FREE ASSEMBLY ENGINEERING SERVICE*** is provided by High Speed Hammer Co. Just send samples or blue prints of parts to be assembled. We'll recommend the right tools, procedure and equipment to use . . . without cost or obligation.

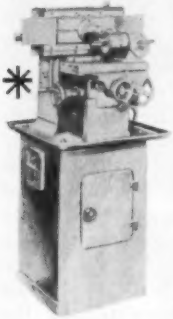
**HIGH SPEED HAMMER CO., INC.**
315 Norton St., Rochester 21, N. Y.

Manufacturers of High Speed Riveting Hammers, Staking Machines, Solenoid Punches, Noiseless Rivet Spinners, Hand Presses, Wire Strippers and Sensitive Drilling Machines.

**NOTE:** We have the most complete line of riveting machinery and can recommend the correct type machine, tooled and ready to go into operation upon delivery.

For more data circle **571** on Reader Service Card

## FORM and PUNCH SHAPER



***ECONOMICAL PUNCHES with CURVED NECKS finished completely IN ONE CHUCKING***




- finish job in one chucking
- 30 power built-in microscope for high precision — close tolerances

*EXCLUSIVE TERRITORIES OPEN*
write for complete information to . . .

**Jersey manufacturing co.**
401-C LIVINGSTON ST. • ELIZABETH, N. J.

For more data circle **572** on Reader Service Card

## HIGH SPEED PRODUCTION DRILLING OF VERY SMALL HOLES . . .



***is accomplished more efficiently, more economically with a drilling machine specifically designed for this type of work.***

Electro-Mechano 8" drill presses include all those features which years of experience have proven to be best for profitable operation in the drilling range of .004 to 5/32".

***Write NOW for Descriptive Bulletin!***

**The ELECTRO-MECHANO Co.**
**265 E. Erie St., Milwaukee 2, Wisconsin**

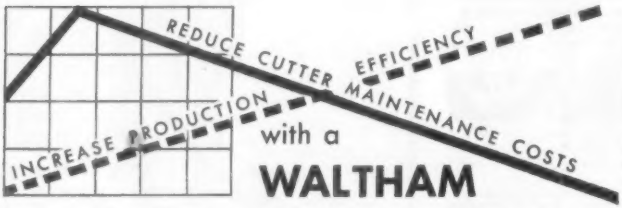
For more data circle **573** on Reader Service Card

ceives the internal gears one-at-a-time from a magazine feed, hangs them on the cutter and provides the meshing problem solution. The loader can be installed on the company's Model GCR internal shaving machines.

Internal gears to be shaved are loaded in a magazine where they roll by gravity to a position in front of an air-powered plunger. The plunger pushes one gear at a time into the loading sleeve, which is mounted on a swinging arm and swung through an arc by an air cylinder-controlled linkage. The pushing of an unshaved gear into the sleeve at this raised position causes a finish-shaved gear in the other end to be deposited in an unloading magazine where the shaved gears roll to the front of the machine.

In the next loader sequence, the sleeve holding the unshaved gear is swung downward by the air cylinder into line with the work spindle centerline. A finish-shaved gear in the chuck on the work head is ejected by another air cylinder into the sleeve. Entry of the finish shaved gear ejects the unshaved gear in the other end of the sleeve into mesh with the shaving cutter, where it remains hanging on the cutter.

Then the loading sleeve is raised back to the load position. The internal gear and shaving cutter are then advanced as a unit toward the chuck in


CUTTER SHARPENING MACHINE

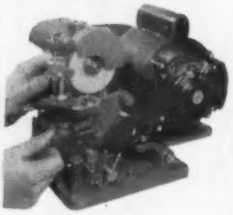
This self-contained machine does not require a skilled operator to grind cutters of small diameter which are sharpened by grinding the face of the tooth.

***Check these outstanding WALTHAM qualities:***

**1. A dulled cutter may be sharpened and returned to service in less than 5 minutes.**

**2. This machine may be adjusted to grind positive or negative rakes as well as radial, changing quickly and accurately from one to the other.**

**3. Being portable this efficient machine may be located in the department where cutters are being used, thus cutters may be sharpened and returned to service immediately. Systematic sharpening by the WALTHAM method minimizes the reduction of the cutter diameter. This eliminates costly adjustments necessary to re-establish the basic work dimensions.**



**4. In two minutes, the cutter, arbor and index may be changed to accommodate cutters having different hole diameters and different numbers of teeth.**

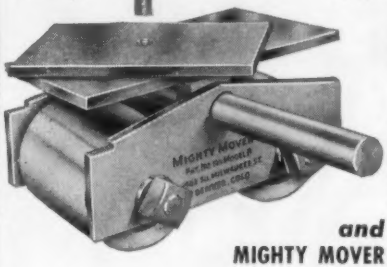
*Send today for Bulletin No. 352*

**WALTHAM** ***MACHINE WORKS, INC.***
**Box 48, Waltham, Mass.**

For more data circle **574** on Reader Service Card

**Save UP TO 80%**

**MOVE YOUR HEAVY MACHINERY** *with your own men*



***and* MIGHTY MOVER *dollies***

Fits any machine base. Load capacity 100,000 lbs. 360° directional control. No skids, cable or pipe needed. Safer, faster. Ask for literature and names of current users for proof.

**MIGHTY MOVER CO.**
**1701 East Louisiana** **Denver 10, Colo.**

For more data circle **575** on Reader Service Card

**NEW IMPROVED TAPER ATTACHMENT**
**For Lathes, Grinders and Milling Machines**

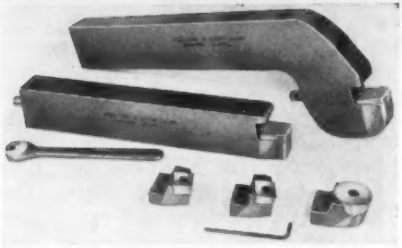



This new indispensable taper attachment is the most versatile unit of its kind. It can be used on any machine for any kind of off-center setup. No need to disturb cross-carriage or tailstock. The operator simply replaces the tailstock center with this new improved TAPER-TAIL unit. The Micro-screw adjustment and positive locking device insure accurate tapers up to 3 inch the full length between centers. Straight work can be immediately resumed by reinserting the original center. TAPER-TAIL's unique carbide ball tip provides perfect spherical contact at any angle, gives extremely long life at high speeds. It is precision made of all steel construction, hardened at all critical points of wear, and fully guaranteed. These new units are now graduated on *TWO* edges, so that graduations can be read in any position.

**L. A. FITZER TOOL WORKS**
**331 E. Park Blvd.** **Villa Park, Ill.**

For more data circle **576** on Reader Service Card

# PRODUCTION TOOLS by APEX



## "NO CLAPPER BOX DELAYS"

Holders with Carbide Plug Tools for heavy duty planing. Other shape tools to change to when operations require. No need to remove the holder to make the change.

"APEX" holders have the original tapered serrated seat for easy adjustment or replacement of tool.

**CATALOGUE SENT UPON REQUEST**

**Visit National Metal Exposition**
**Booth 2816, Cleveland, Ohio**
**October 8th - 12th**

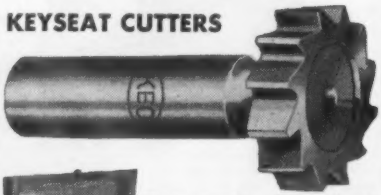
for complete display of holders, tools and inserted tooth milling cutters for all type machines.

**THE APEX TOOL & CUTTER CO., INC., SHELTON 15, CONN.**

For more data circle **577** on Reader Service Card

KEO

KEYSEAT CUTTERS





High speed. Right hand ½" shank. Diameter from ¼" to 1½". Standard sizes in stock for immediate delivery. Complete set —41 sizes—available in sturdy, hardwood box. Saves time and money, because you always have the size you need.

WRITE, WIRE OR PHONE
*Jobbers' inquiries invited*

KEO CUTTERS
19326 Woodward - Detroit 3 Mich.

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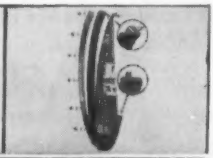
Carter

WHEELS AND GUIDES
Carter band saw accessories used as standard equipment by leading band saw manufacturers.



- Rigid Band Saw Wheels
- Demountable Tires
- Micro-Guides
- Guide-Line Lights

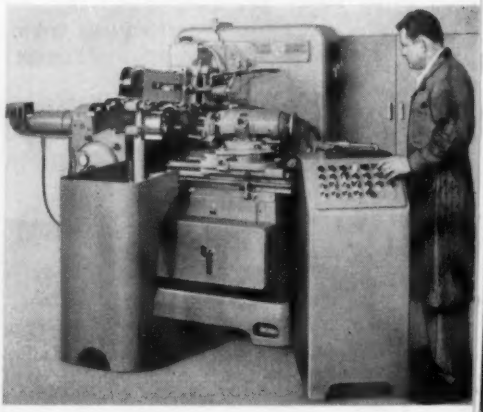




CARTER PRODUCTS CO. INC.
426 Wm. Alden Smith Bldg., 30 Ionia Avenue, S. W.
GRAND RAPIDS 2 MICHIGAN

For more data circle **579** on Reader Service Card





*Red Ring Automatic Loader for internal gears*

the workhead and the gear is chucked, ready for the shaving operation with the cutter in mesh with the gear. At the end of the shaving operation, the cutter spindle is backed out of the gear and returned to its original position for the loading of another unshaved gear.
For more data circle **160** on Reader Service Card

★ ★ ★

## MASKING TAPE WITHSTANDS 275 DEGREES FAHRENHEIT

Commercial availability of a high-temperature crepe masking tape, identified as No. 102 Behr-cat, has been announced by Behr-Manning Co., Troy, N. Y., a division of Norton Company, after thorough testing in both laboratory and field. The quick stick, adhesion and easy unwind properties of this low-cost pressure-sensitive tape recommend it for general purpose use in a wide variety of masking operations, with the added feature that it will resist temperatures of at least 275 degrees F. for one hour. This versatil-

## HI-DUTY HIGH SPEED DRILLS

Since 1903



• FLAT TWISTED • ROLLED SECTION

HI-DUTY—your assurance of increased production . . . lower drill costs!

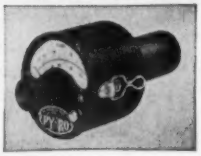
**PROMPT DELIVERIES** on special types of High Speed Drills—special diameters and lengths; also step drills. Large variety in stock!

*Contact your Industrial Supplier—or write for FREE Catalog and Price List.*

**HI-DUTY DRILL WORKS**
**FLEETWOOD, PENNSYLVANIA**

For more data circle **580** on Reader Service Card

## PYRO Radiation Pyrometer



Determines spot temperatures of heat-treating furnaces, fire boxes, kilns and forgings accurately—instantly. No thermocouples, lead wires or accessories needed. Temperature is recorded on direct-reading dial at press of button. Two double ranges. Write for FREE Cat. #100.

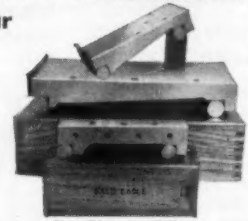
**The PYROMETER INSTRUMENT Co.**
New Plant and Lab., Bergenfield 42, N. J.

For more data circle **581** on Reader Service Card

## ACCURATE—LOW COST SINE BARS and PLATES

**5" Sine Bar only $21.75**

- Guaranteed Accuracy
- Precision Ground
- Hardened Rolls
- Double Normalized
- Tapped Holes
- End Plates
- Solid Oak Case Extra
- Immediate Shipment



Sine Plates and Bars

| No. | Cent. Dist. | Width | Price | With Oak Case |
|---|---|---|---|---|
| 1605 | 5" | 3" | 37.50 | 43.00 |
| 1610 | 10" | 5" | 87.50 | 95.00 |
| 1705 | 5" | 1" | 21.75 | 25.25 |

FOB St. Paul.

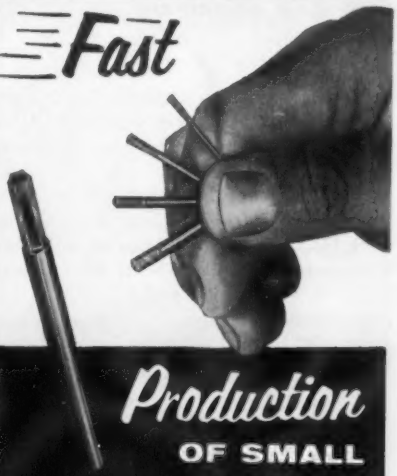
Accurate to .0002" in center distance and parallelism for the length of the tool. Order Today—from your dealer or direct.



*Bald Eagle Corporation*
(Formerly Bald Eagle Tool Company)
357 Minnesota St. St. Paul 1, Minn.

For more data circle **582** on Reader Service Card

## Fast Production OF SMALL HEX SOCKETS



These new strike broaches by W & S small tool specialists are for quantity production of sharp, clean hex sockets in set or cap screws. Made of specially heat-treated, high speed steel, they are ground to a tolerance of 0.0005" across the flats. For set screw sizes #0 to ¼".

If you use small tools, and you are not familiar with W & S tools and tool design service, write to:

**WOODRUFF & STOKES CO.**
INCORPORATED
Bldg. 32, 355 Lincoln St.,
Hingham, Massachusetts

For more data circle **583** on Reader Service Card

ity is expected to simplify inventory requirements for users who may have been stocking two or more types of tape.

Tensile strength of the tape is 20 lb. per inch of width; elongation is 13.5 per cent. Of 9-mil gauge, it has an adhesion to stainless steel of 33 oz. per inch of width. It is made in a full range of widths from ¼-inch upward and is bulk packaged in standard cartons.

For more data circle **161** on Reader Service Card

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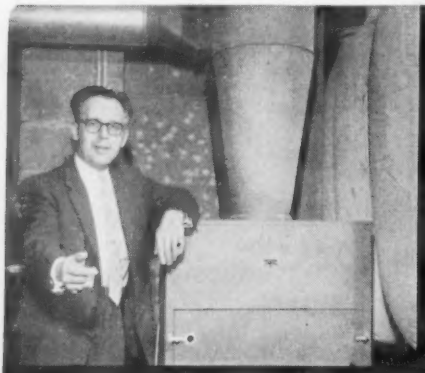
## RESTYLED MICROMETERS

Slocomb Micrometer Co., 122 Naubac, Glastonbury, Conn., has announced the completion of the restyling and modernization of its entire line of micrometers. Among the improvements are a wear resistant, non-glare satin chrome finish on sleeve and thimble and a durable non-slip black wrinkle finish on frame. The spindle is now double hardened and the threads are formed by the latest method for greater accuracy.

For more data circle **162** on Reader Service Card



*Slocomb Micrometer*

"TORIT dust collectors saved us $3,000."

**FREE BOOKLET shows you how to trap harmful dust better at less cost with TORIT.**

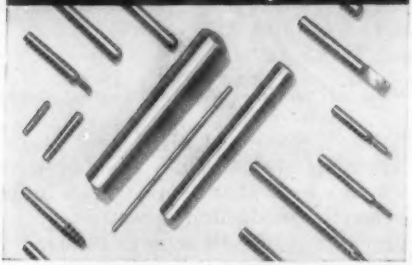
Your plant can have the same initial savings and cost-cutting operation now enjoyed by the Sico Manufacturing Company, national producers of tables and seating equipment. Sico President, Kermit H. Wilson states, " . . the lowest bid we had for a central dust collection system of minimum capacity was just under $4,000. Our $900 Torit installation has completely solved our dust problem and gives us greater flexibility than would be possible with a central system." There's a TORIT Collector to meet every type of dust problem, why not investigate?

*FREE facts on TORIT DUST COLLECTORS that reduce maintenance costs, up production, improve employee morale. Write today to:*

**TORIT MANUFACTURING CO.**
296 Walnut Street, St. Paul 2, Minn., Dept. 711

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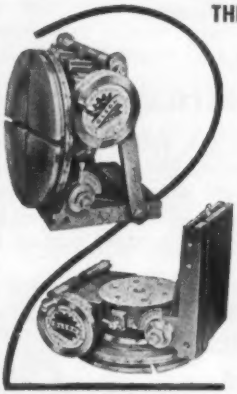
Peaslee
DOWELS, PINS, SHAFTS, ETC.



Specializing in Stainless Steel
Standard and Made to Order Precision Parts
Send Your Blueprints for Prompt Quotations

PEASLEE METAL PRODUCTS CO.
470 Tolland St.
EAST HARTFORD, CONN.

For more data circle 585 on Reader Service Card



THE TWO IN ONE
COMBINATION ROTARY TABLE AND ANGLE PLATE
PRECISION ACCURACY
WORM adjustable from 0 to 90 degrees.
VERNIER control to within 2 seconds of Arc.

WRITE FOR FOLDER

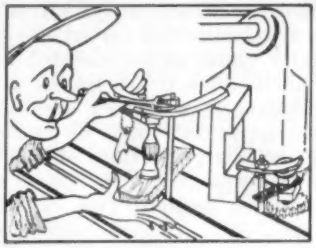
Makers of Helical Gear Speed Reducers. Worm and Gear Speed Reducers. Standard and Special Gears. Wedge-Lock Turret for Lathes and Turret Lathes.

*Open territory available to representatives*

OLSON INDUSTRIAL PRODUCTS, INC.
40 W. WATER ST. • WAKEFIELD, MASS

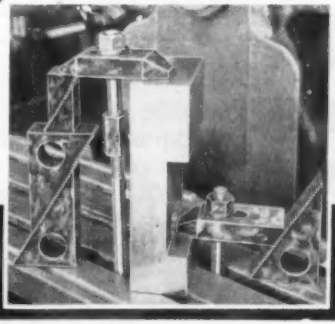
For more data circle 586 on Reader Service Card

WHY WASTE YOUR PROFITS ON MAKESHIFT SETUPS?






BE WISE
*Save with*
NORTHWESTERN



T-NUT & STUD SETS – *12 SIZES*
PUNCH PRESS SETS – *5 SIZES*
STEP BLOCK & CLAMP SETS – *5 SIZES*

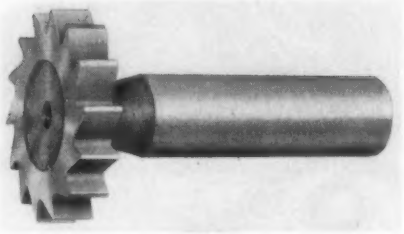
*CATALOG No. 23 SENT ON REQUEST*

Northwestern
119 HOLLIER AVE., DAYTON 3, OHIO

For more data circle 587 on Reader Service Card

## WOODRUFF KEYSEAT CUTTERS

Supreme Keyseat Cutters Co., 1328-43rd St., Kenosha, Wis., has announced that they are now manufacturing and stocking 41 sizes of American Standard Woodruff keyseat cutters in both standard and high speed steels. The company states they offer fast service on special shank type cutters in its expanded production department.



*View of Supreme Woodruff Keyseat Cutter*

For more data circle **163** on Reader Service Card

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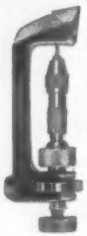
## RADIAL-ARM MACHINES SHAPE AIRCRAFT PARTS

Ekstrom, Carlson & Co., Rockford, Ill., has announced the introduction of two machines for use in the aircraft industry. Use of these machines can help greatly to reduce costs and speed up production of large aluminum parts that have to be literally carved by hand from thick plates of the metal. Many wing panels, slugs, doors, frames, ribs, spars, stiffeners, and other important airframe parts are made by simply cutting away large portions of an aluminum plate in order to leave the complex form desired. This calls for

Low Cost Automatic
**HORIZONTAL STOCK REEL**
Self-powered
24" dia. $85.00
30" $90.00
36" $95.00
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**TRUE POINT DRILL SHARPENER**
for Drills 41 - 60 and 61 - 80 R.H. & L.H.
A properly sharpened drill cuts faster — more accurately and is less likely to break.
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the "Where to Get It" section of MODERN MACHINE SHOP provides a quick reference to machinery, tools and supplies advertised in the current issue. Use it consistently. You'll find it's very helpful. (See pages 384, 386, 388, 390 and 392.)
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431 MAIN STREET • CINCINNATI 2, OHIO

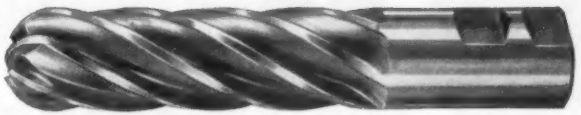
a machine with a high-speed spindle and a cutter capable of routing difficult contours and milling various shapes to different depths.

According to the manufacturer, these depth and contour mills meet these requirements in a highly effective and efficient manner. The basic machine consists of a heavy column-like base carrying a sturdy, jointed, radial arm. At the end of the arm is mounted a high-cycle high-speed direct-drive cutter motor which is available with adjustable speeds as high as 14,000 r.p.m. to as low as 3,600. A T-slotted table under the arm holds the aluminum slab to be machined. These machines come in two sizes, the difference being principally in the length of the radial arm. The No. 480 shown in the illustration is the larger of the two, with a maximum arm extension of 120 inches from column center to spindle center. This machine has a 60 x 120 inch work table. The arms are so pivoted that they have an extensive swing at each joint, so that the cutter can be easily and quickly moved all over the work table area.

An optional accessory is a canopy structure to which can be mounted an overhead templet. To use such a templet, an overhead follower is attached to the upper part of the outer arm so that it lines up directly with the cutter spindle. This follower is retractable and adjustable by a mote control hydraulic mechanism. Follower inserts can be selected to match cutter sizes.

The cutter motor is slide-mounted

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WELDON

MULTI-FLUTE
BALL END MILLS

These ball end mills for use on automatically controlled duplicating equipment are now available in 32 stock sizes. They are also for use on conventional milling or die sinking machines.

Weldon standard holders accommodate all sizes.

*For complete listing of sizes write or phone your nearest Weldon dealer for circular number KM-1*

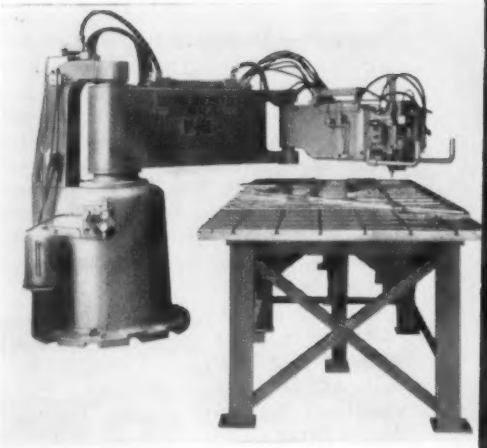
THE WELDON TOOL COMPANY



3000 WOODHILL ROAD · · · CLEVELAND 4, OHIO

For more data circle 591 on Reader Service Card

and independently adjustable for depth of cut by a separate hydraulic cylinder. For greater cutting power and lower maintenance costs, water cooled motors are used. Other features include mist lubrication to motor bearings, double slides, four-position depth stops with micrometer adjustments, chuck nut or drawbar type collets, and many others. The manufacturer guarantees depth cutting performance to 0.005 inch.



*Overall illustration showing Ekstrom, Carlson No. 480 Depth and Contour Milling Machine*

For more data circle **164** on Reader Service Card

★ ★ ★

## BRAKE PRESS DESIGNED FOR PUNCHING

The Steelweld Machinery Div., The Cleveland Crane & Engineering Co., Wickliffe, Ohio, is now building press brakes with modifications to accom-


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**Boring Tools**
(H. S. S. and Carbide)
for Holes from 1/16" Upward

STANDARD AND SPECIAL BORING, FACING & INTERNAL THREADING TOOLS

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**6" Universal Dividing Head**

*with*

**DIRECT INDEXING**

Optional SWIVEL BASE converts a conventional dividing head into a universal work head or rotary table. Change-over is accomplished in seconds without tools or wrenches.

Also available in 10" - 12" sizes and in 10" - 12" spiral drive.

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GRIND THE
*Eastern Centerless Way*

Our new plant with increased facilities assures
**PROMPT SERVICE**
**Eastern Centerless Grinding Co**
**470 Telland Street East Hartford 8, Conn.**

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modate various punching requirements. A machine recently completed of 400 tons capacity was provided with a double-plate bed which has a 3 inch wide slot to receive punching slugs. The bed of this machine is 8 feet 4 inches long by 17 inches wide. The press has a speed of 30 strokes per minute, but the stroke length is only two inches. The punch velocity, consequently, is very low and impact minimum, thus resulting in long punch life.

The clutch and brake are air-operated and designed so that inertia is very low thereby minimizing energy to be absorbed. Discs are hollow at the center and enable passage of large volumes of cooling air. Unit working pressure on clutch and brake facings is low. Because of these features cool operation is assured, even after long periods of continuous production. Other features include a motor-driven ram adjustment for securing desired shut-height, air counterbalance for ram, automatic oilers for bearings, ram ball joints with replaceable bearings, rigid one-piece welded steel frame and 18 inch deep throat.

This machine was designed to be placed 14 inches below floor level to provide a low working height. When so located, the foot treadle, which extends across the front of the bed, is easily operated by foot just above the floor, and the top of the bed is 28 inches above the floor. Control is provided for two-man operation with three push-buttons for each man mounted on the ram. Before the press can be set in motion,


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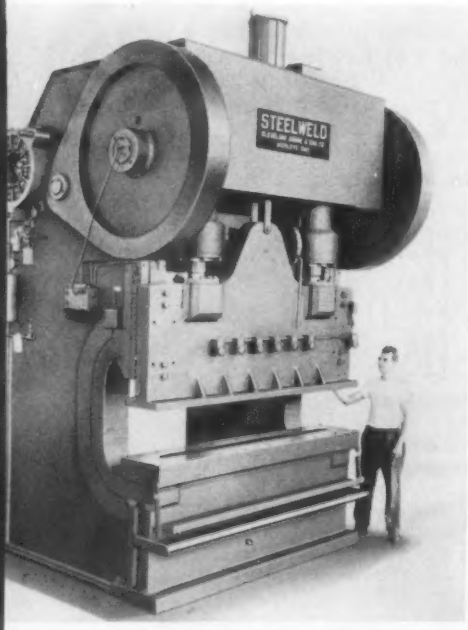



*Illustration showing Steelweld Brake Press*

four of the buttons must be depressed, thus necessitating both of the hands of the two men being in position. One button in each of the three-button groups is for stopping, permitting either operator to quickly stop the press. One set of three buttons can be locked out of the control circuit when the machine is operated by one man.

For more data circle **165** on Reader Service Card

## RING SEALS FOR COLLETS

Balas Collet Mfg. Co., Cleveland 14, Ohio, has announced that it is now incorporating a Neoprene "O" ring seal into its collets. The seal is designed to keep the dirt out of the aperture between the collet draw tube and dirt from working back into the chucking mechanism. It is claimed by the manufacturer that machines equipped with the collets having the ring seal will operate for over a year without having to clean the spindles and draw tubes.

For more data circle **166** on Reader Service Card

★ ★ ★

## CENTERLESS TURNING MACHINE

Turnomat Co., Inc., Dept. AK, Brockport, N. Y., has announced its centerless turning machine. The machine makes it possible to turn unusual, intricate shapes, contours and tapers of infinite lengths in one pass, one plunge cut. It handles easily all grades of steel, copper, brass, aluminum, plastics or wood, from largest bar stock diameter machine capacity to needle point diameters. Workpieces can be precision turned to close tolerances (plus or minus 0.0005) and fine microfinish without tool chatter and tool marks.

One pass, with its single point cutting tool, can turn pieces to unlimited contours, tracer shapes and designs, including straight 90 degrees, reverse and straight shoulder-to-shoulder cuts, not possible with any other tracer turn-

**CENTERLESS GRINDING**

**Brown & Sharpe and Swiss Automatic screw machine parts, aircraft and standard, heat treated and ground if necessary. Send blue prints for estimates. 27 years serving industry. The Porter Machine Co., Cincinnati 9, Ohio.**

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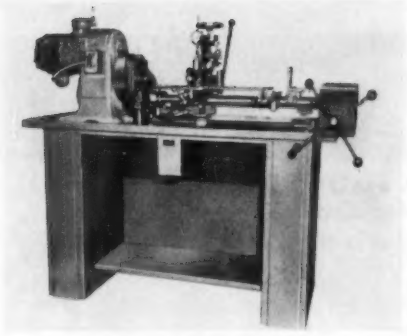
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*View of Turnomat Centerless Turning Machine*

ing lathe or automatics. With a two position and operation attachment you can center drill, light drill, ream, chamfer and burr. The manufacturer states that short or long production runs of workpieces can be produced with a minimum expenditure and effort and without expensive set-ups, cams, gears and multi-cutting tools. Semi skilled machine operators find it easy to operate and to produce precision-made workpieces.

The machines are built in three sizes: Models 1000, 1750 and 3500, to handle maximum round bar stock diameters of 1-1/6 inches, 1¾ inches and 3½ inches respectively. Larger production work models are engineered to customers' requirements.

For more data circle **167** on Reader Service Card

★ ★ ★

## ADDITION

The complete chamber dimensions of the Cooley Model GA-4 Toolroom Furnace illustrated and described on Page 204 of the August issue of *Modern Machine Shop* are 10 x 8 x 18 inches.

★ ★ ★ ★ ★


NEW General

FLEXIBLE POWER STRAIGHTENING PRESSES WITH AIR CONTROLLED CLUTCH

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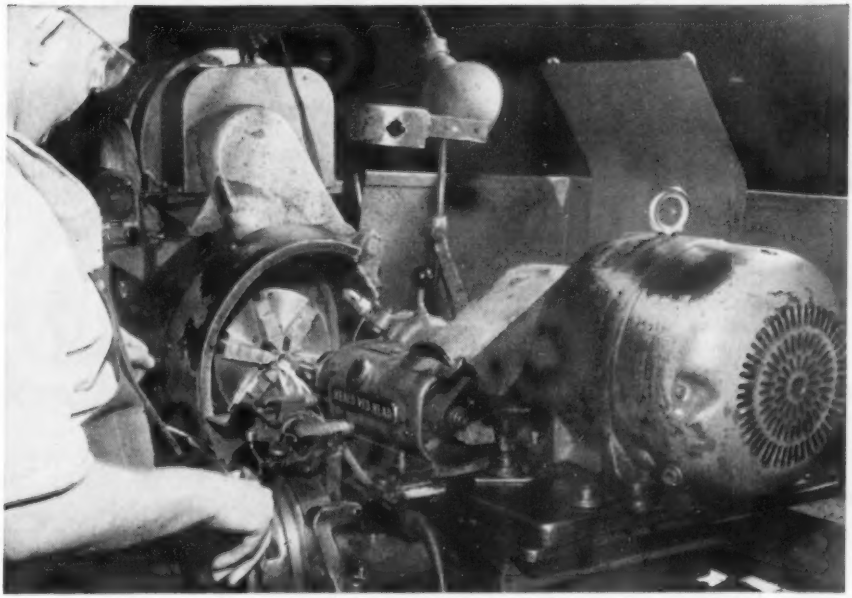

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# Buck AJUST-TRU CHUCKS

## "Hold O.D. and I.D. within .001" day in and day out."



Buck Ajust-Tru chucks are ideal for precision grinding. Most recent report is from Mr. Chester Nelson, Supt. Press & Machine Div., J. I. Case Company, Bettendorf, Iowa. He writes —

"The part has been O.D. ground on a Centerless Grinder first, then the I.D. is ground by being held in the six (6) jaw Buck Chuck. The accuracy of the Buck Chuck is used to its fullest extent since the O.D. and I.D. have to be concentric within .001" total indicator runout. This tolerance is being held constantly day in and day out."

You, too, can handle precision grinding *faster* and *at less cost* with Buck Ajust-Tru chucks. Takes but a moment to send for literature — write today.

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Ask for information about the new Buck standard and Compensating chucks — up to 12".

**BUCK TOOL COMPANY**

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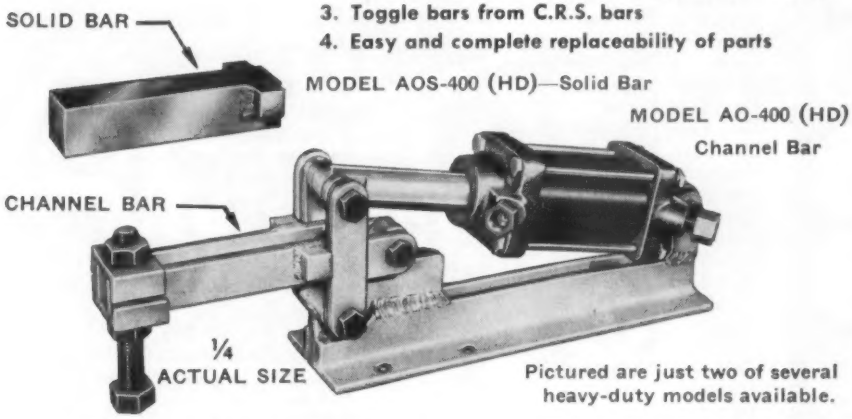
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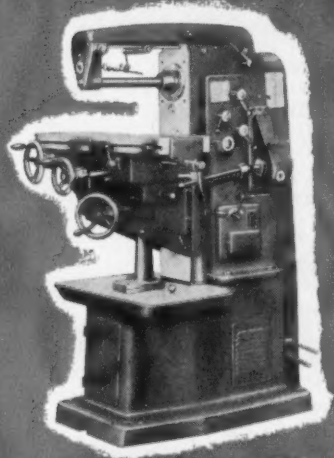
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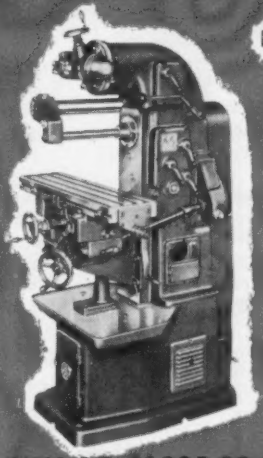
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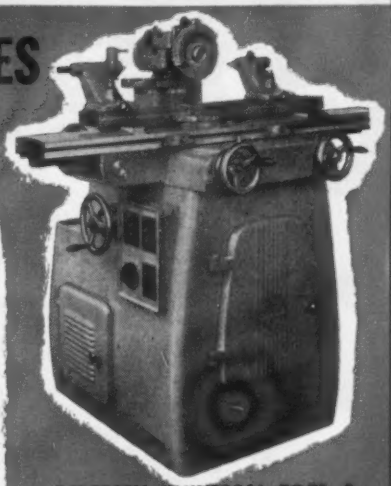
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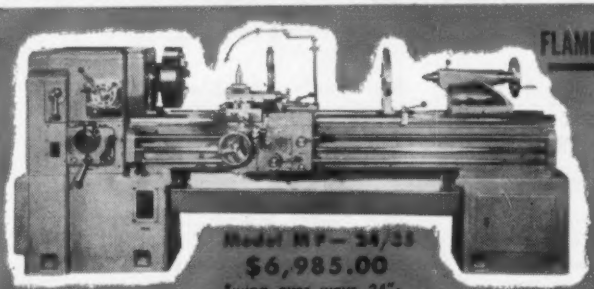


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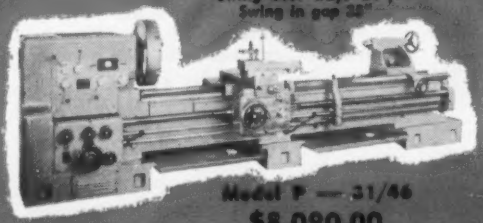
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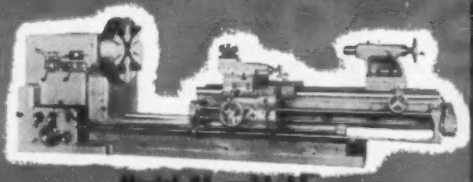
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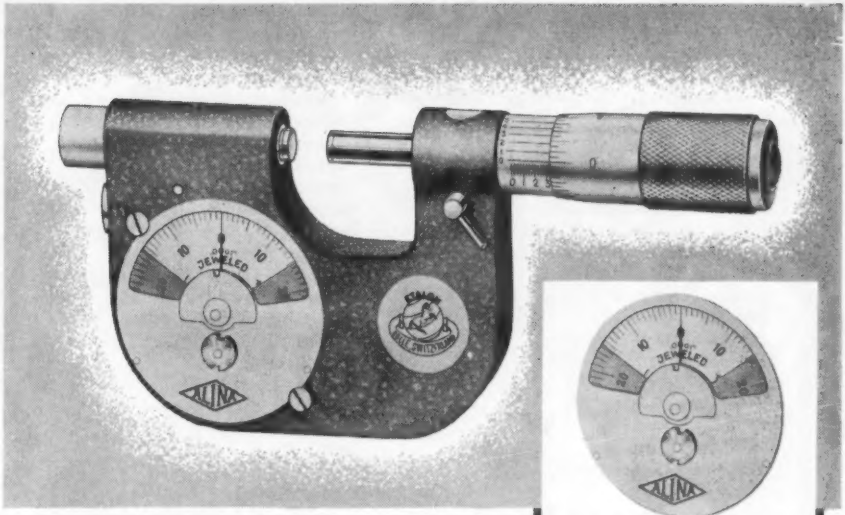
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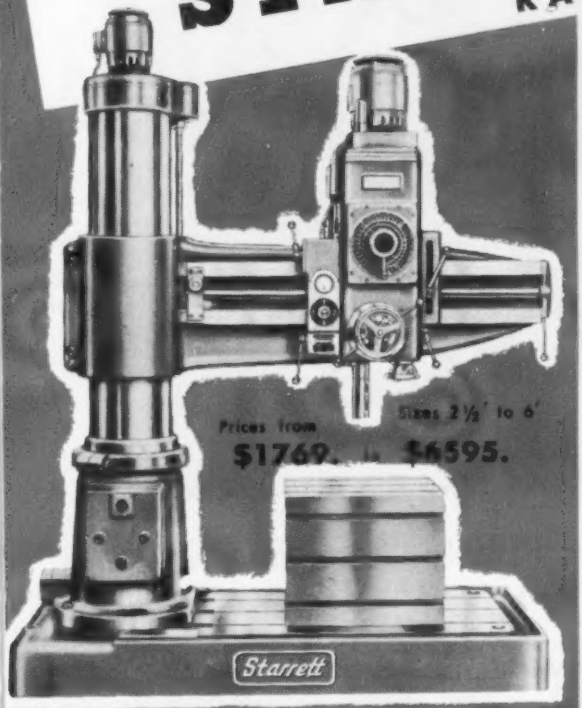
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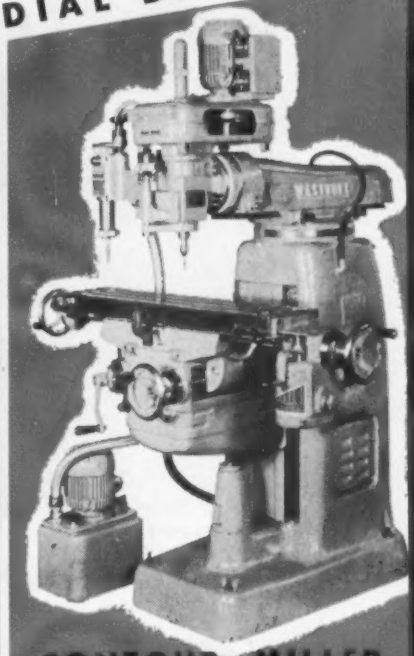
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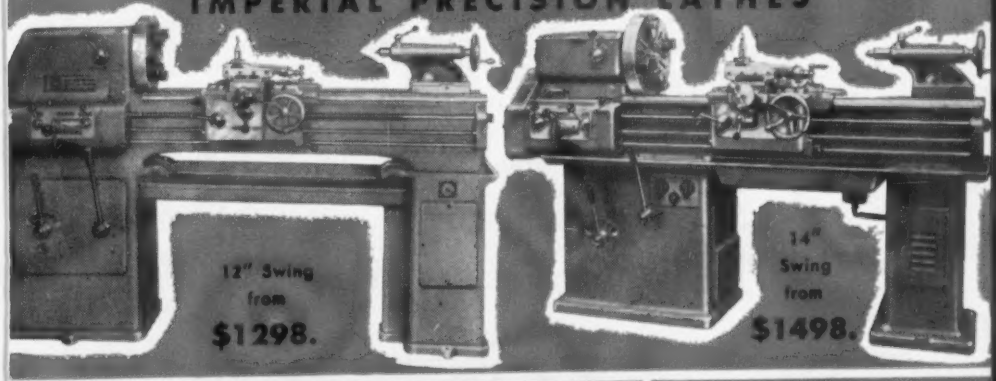

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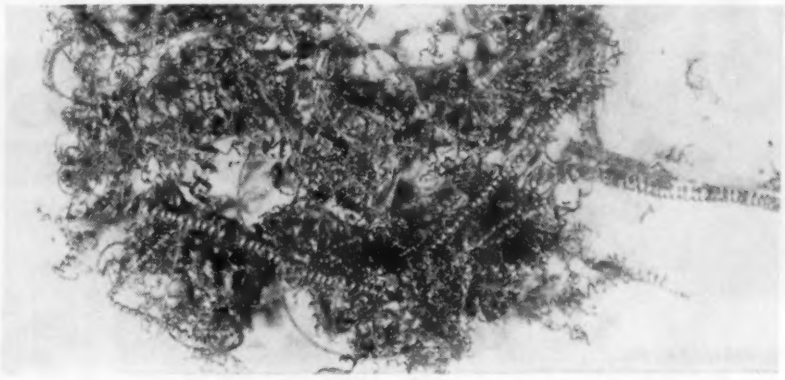
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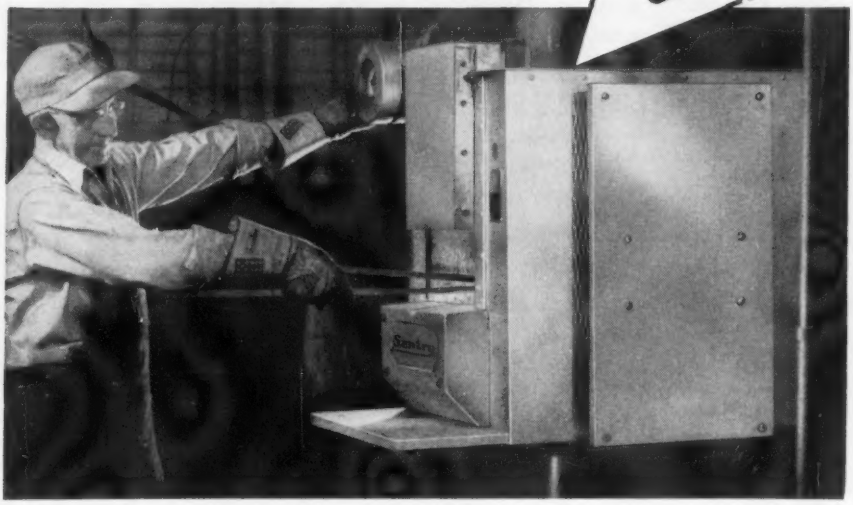
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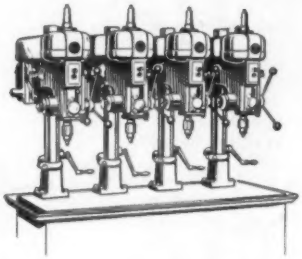
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# W-T WALKER-TURNER

## 6″ Spindle travel means BIG MACHINE capacity in this 15″ Drill Press!





You don't have to go to a 20″ or larger drill press to get 6″ spindle travel. With this 15″ Walker-Turner, you can drill holes up to 6″ deep at one pass of the drill, in diameters from #60 to ½″.

This extra-capacity "LIGHT-HEAVY-WEIGHT" is built to deliver fast, accurate production drilling in your plant, 24 hours a day, for a long span of years.

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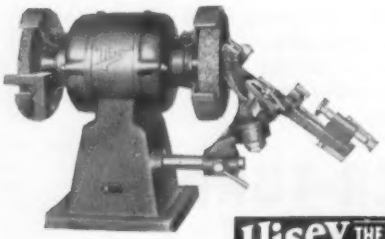
# *Are you having TROUBLES in your Drill Department?*

Following are some of the most common and their causes:

| Trouble | Cause |
|---|---|
| Oversize holes. | Unequal lip length. |
| Drill burns—will not cut. | Insufficient clearance. |
| Cutting edge chips or crumbles. | Too much clearance. |
| Outer corners of lip break down. Excessive wear on margins. | Speed too high. |
| Rough holes. Drill breakage. Drill point crushes. | Speed too slow or Feed too heavy. |
| Broken tangs. | Dirt or chips in socket or worn out socket. |

Most of the above can be overcome by using a precision type Drill Grinder. A Hisey Drill Grinder will quickly pay for itself when you consider that drills that are correctly ground and kept sharp will (1) drill faster, (2) drill more holes per grind, (3) drill to exact size, (4) reduce breakage, (5) increase life of drill by removing less metal when sharpening.

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Division of The Cincinnati Electrical Tool Co.

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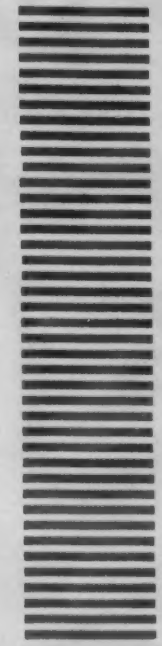
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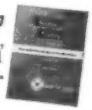
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